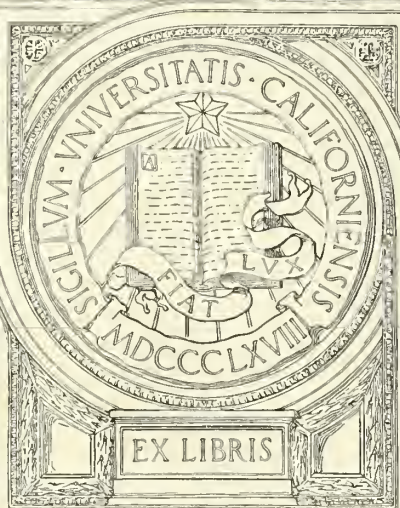


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MINNESOTA MEDICINE

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Number 1

BIOLOGIC EFFECTS OF ACTIVE THYMUS AND PINEAL EXTRACTS*

A Brief Review

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Faribault, Minnesota

IN VIEW of previous publications and articles now in press,^{2,3} which report the detailed studies in determining the biological effects of active thymus and pineal extracts at the Philadelphia Institute for Medical Research, the subject will be briefly considered as a continuation of an earlier report.¹

Briefly stated, the work of Rowntree, Clark, and Steinberg revealed accruing acceleration in development in successive generations of rats under continuous treatment with thymus extract administered intraperitoneally daily, in 1 c.c. doses, starting treatment on the fortieth to sixtieth day in the mature group and on the sixteenth to the twenty-fifth day in the prepubertal group. In the text F0 animals are referred to as the first generation and F9 as the tenth generation, respectively.

It will be noted in Table I that the average birth weight, in the controls, was 5.0 gms., but in the tenth generation, 6.0 gms.; eyes opened in the controls in fourteen to seventeen days, in the tenth generation in thirty-four to forty-two hours; teeth erupted in the controls on the ninth to the tenth day, in the tenth generation at birth; hair appeared in the controls on the fourteenth to seventeenth day, in the tenth generation on the first day; testes descended in the controls on the thirty-fifth to fortieth day, in the tenth generation on the second to the third day; the vagina opened in the controls on the fifty-fifth to the sixty-second day, in the tenth generation on the sixth day.

In the ninth generation, pregnancy occurred as early as twenty-two days with a litter being cast in forty-three days, thus establishing definite evidence of early sexual maturity; whereas, the average age at which a control conceived was eighty days to deliver at 103 days.

From the fifth to the tenth generation the young have been weaned as early as forty-eight to seventy-two hours and found to thrive as well as their litter mates left with the mother.

A step-like acceleration in growth and development has been noted in succeeding generations up to the tenth generation in which the most striking evidence was the opening of the vagina on the sixth day and the demonstration of estrus three days later, which is the accepted indication of maturity. This observation, which has never been made before, was so striking and conclusive that there can no longer be even a reasonable doubt of the cumulative effect of thymus through succeeding generations.

Many difficulties were met in determining the biological effects of thymus extract. Subsequent to the original active extracts, supplied for this investigation, variations in activity were encountered. The original extract first used at the Philadelphia Institute for Medical Research was as old as three years and was found highly potent. This extract had a pH 4.1 and was dispensed in 10 c.c. vials of lamp-blown resistance glass with low alkali content and were tightly stoppered and capped. Fresh thymus extracts were later distributed in 50 c.c. amber colored bottles of a lesser quality glass with rubber-diaphragm caps, and, though wired, were not as tight as might be. These lots of thymus extract

*Read at the annual meeting of the Minnesota State Medical Association, Minneapolis, June 24, 1935.

ACTIVE THYMUS AND PINEAL EXTRACTS—HANSON

TABLE I. PROGRESSIVE DEVELOPMENT UNDER THYMUS TREATMENT¹

	Con- trols	F1	F2	F3	F4	F5	F6	F7	F8	F9
Average birth weight, grams	New 5.0 Old 4.6	5.1	5.3	5.3	5.6	5.5	5.6	5.5	6.5	6.0
Ears opened, days	2½-3½	2-3	2	1-2	1-2	1-2	1½-2	Birth to 1	Birth to 1	Birth to 1
Teeth erupted, days	8-10	8-9	4-6	4-6	2-3	2	1-2	Birth to 1	Birth to 1	Birth to 1
Hair appeared, days	12-16	10-12	4-6	4-6	2-3	2	1-2	1-2	1	1
Eyes opened, days	14-17	12-14	4-6	4-6	2-3	2-3	2-3	42-48 hrs.	42-48 hrs.	36-42 hrs.
Testes descended, days	35-40	15-29	15-21	10-12	6-10	4-6	3-10	3-4	3-4	2-3
Vagina opened, days	55-62	30-45	23-32	21-27	18-20	18-20	16-20	16-18	16-18	6
Pregnant, days from birth	80	70	56	42	25	40	40	37	22	—
First litters cast, days from birth	102	92	78	64	47	61	68	59	43	—

were found to range from pH 4.66-4.70. These extracts did not retain their activity and rapidly became inert.

Experiments and checks at the Philadelphia Institute for Medical Research have revealed that the active extracts of thymus contain sulphydril estimated as glutathione. Glutathione dissolved in a dilute hydrochloric acid of pH 5.0 disappears as such in a few days, but in a hydrochloric acid of pH 2.0 it is quite stable.

By employing the following modification carried out at the Philadelphia Institute for Medical Research, an extract that retains its potency over a longer period of time is secured. At that institution the thymus extract is prepared in hydrochloric acid, 1 per cent by volume (0.4 per cent by weight), 1 gm. of raw gland to each c.c. of solution. The glands are macerated while still warm from the kill at the slaughter-house, and immediately covered with the acid above described. The mixture is then placed in a refrigerator over night,† if most convenient, before heating rapidly with constant stirring to 92 degrees C., employing about one-half hour in the process. This is allowed to settle and the clear extract siphoned off, when the residue is re-extracted in half of the bulk of the same strength hydrochloric acid, bringing the temperature to 92 degrees C. in ten to fifteen minutes.

The extract may then be concentrated by

†At the Philadelphia Institute for Medical Research the glands fresh from the kill are macerated at the slaughter-house and mixed with hydrochloric acid 1 per cent by volume. The mixture is then transferred in a large glass flask to the institution, where it is immediately heated to 92 degrees C. and treated as described.

evaporating on a water bath at 60 degrees C. in a blast of air so that each c.c. represents 1 gm. of the fresh raw gland and adjusted to pH 2.0. Chlorbutol, 0.2 per cent, is used as a preservative at the Philadelphia Institute. There they also employ thymus extracts in which each c.c. represents 2 to 3 gms. of the fresh gland.

The effects obtained with thymus extracts were controlled by placing a group of animals under similar conditions on a hydrochloric acid solution of glutathione pH 2.0, equivalent to the same amount present in the active thymus extracts used. Another group, by a similar method of administration, has been treated with a hydrochloric acid extract of mesenteric lymph gland. Still another group is receiving a similarly made splenic extract and, finally, a group has been placed on combinations of glycine, cystine and glutamic acid, which are decomposition products of glutathione. Results on these experiments will appear in subsequent publications. Thus far the effects cannot be associated with the so-called thymus effect.

Subsequent to the positive findings of Rown-tree, Clark and Steinberg it was found that ablation of the thymus gland in successive generations of white rats resulted in retardation in growth and development as shown by Dr. N. H. Einhorn. Administration of the active thymus extract restores these animals to normal. Thus the latter constitutes replacement therapy.

As a result of these biological studies, it is now quite evident that the effect of this thymus

activity is that of orderly, although accelerated, development to puberty and maturity, and that this effect is as striking on mentality as on bodily growth as evidenced by early weaning and maturity. With an excess of thymus, activity development becomes more marked with each succeeding generation. Rowntree and his co-workers have, so to speak, made a minute hand out of the hour hand of nature's clock.‡

The success attending the thymus studies prompted Rowntree and his collaborators to attempt the same procedure with pineal extracts. One of twenty pineal extracts, prepared and partly studied by the writer, in 1927, formed the basis for the preparation of the pineal extracts found active in the new study.

Effect of Pineal Extract

A small colony of four rats (Wistar strain) was started on pineal extract on March 2, 1934. At the present time the fifth generation of pineal treated rats has been reached and there are over 300 rats in the colony.

As the time is so limited, a little more detail will be brought out in the slides and the film will speak for itself. Suffice it to say that the outstanding effect is dwarfism. The young animal shows considerable variation from the normal in that it has a short snout, broad face, round head, heavy jowl and prominent eyes, giving it a "bull-dog" appearance. The body is small, the feet large, and it assumes a characteristic squat. After the first month it resembles a normal rat in miniature. At 100 to 200 days of age, these rats appear larger than their actual size due to a heavy coat of fur. Gonadal development appears earlier than bodily development. Gonadal development is quite marked in the second generation, while the precocity in bodily development does not appear until the third generation.

There is a lack of uniformity in the size and rate of growth of individuals in litters of the same and succeeding generations. The smallest animals die in several days from starvation due to inability to nurse, and loss of body heat

because of the mother's neglect, in many instances. While the pineal animal is dwarfed, it grows hair and matures sexually in about one-half the normal time. These animals breed

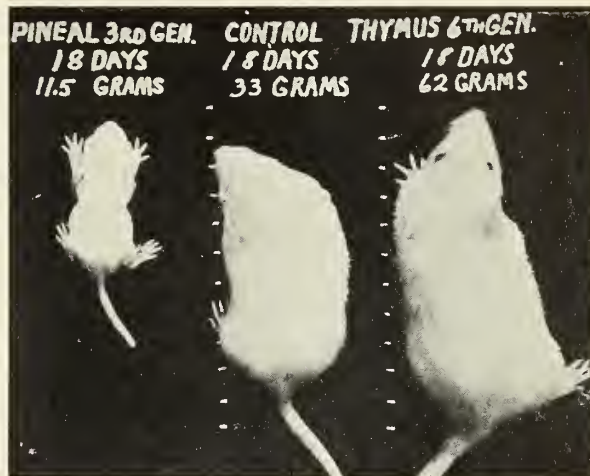


Fig. 1. Photograph of pineal, control and thymus rats, eighteen days of age.

rapidly and wear themselves out early in life. One pair of pineal treated rats that died from a respiratory infection, on the 428th day, revealed the thymus glands to be small and the adrenal glands large at autopsy; whereas, the opposite is true in the thymus treated animals. Surviving animals from pineal treated parents have weighed as low as 2.5 gms. at birth while the average birth weight of the controls was 5.0 gms.

The progressive effects on pineal treated rats are retardation in growth with acceleration in gonadal and bodily development. This suggests the clinical picture seen in pineal tumor, though the animals do not pass through a period of early accelerated growth occasionally noted in clinical conditions. There is early inactivity and weakness and it is not until fifteen to twenty days of age that these rats will climb the side of the cage or attempt to escape from a small wire enclosure. Eye anomalies have been frequently observed, with two instances of congenital hypertrophy of the eye, two of anophthalmia, and a number of cases of bilateral and unilateral congenital cataracts.

The progressive development under pineal treatment is briefly summarized in Table II.

The teeth erupted in the controls on the eighth to the tenth day, in the fifth generation

‡A clock-like precision was noted in everything up to the seventh generation and to a certain extent on to the tenth. The weight curve is in an almost identical channel from the seventh to the tenth although there is the step-like increase in the shortening of the time for the appearance of the biological phenomena. The same uniformity of results in the seventh to the tenth did not occur like were obtained up to the seventh generation because of variability and the extracts employed.

ACTIVE THYMUS AND PINEAL EXTRACTS—HANSON

TABLE II. PROGRESSIVE DEVELOPMENT UNDER PINEAL TREATMENT

	Ears opened	Teeth erupt.	Fur app'd	Eyes opened	Testes desc'd	Vagina op'd
Controls	2½-3½	8-10	16	14-17	31-40	55-72
Average	(3)	(9)	(16)	(15.5)	(38)	(65)
F1	2-4	8-10	7-16	12-17	12-36	32-56
Average	(3.3)	(9)	(13)	(14.9)	(22)	(45)
F2	2-3	7-11	6-17	12-16	6-26	30-39
Average	(2.8)	(9)	(12)	(13.8)	(15)	(37)
F3	2-3	5-8	5-12	5-12	5-12	29-39
Average	(2.3)	(6.9)	(9)	(9.8)	(10)	(32)
F4	1-3	3-5	4-8	4-8	4-6	23-26
Average	(2)	(4)	(5)	(6)	(5)	(24)

in three to five days; the fur appeared on the controls on the sixteenth day, in the fifth generation in four to eight days; the eyes opened in the controls on the fourteenth to the seventeenth day, in the fifth generation in four to eight days; the testes descended in the controls on the thirty-first to the fortieth day, in the fifth generation in four to eight days; the vagina opened in the controls on the fifty-fifth to the seventy-second day, in the fifth generation in twenty-three to twenty-six days.

An attempt is now being made to study the effect of pinealectomy in successive generations of white rats.

The pineal extract* found to be most active is that known as P-B 22. It is that fraction of a pineal picrate soluble in hydrochloric acid 0.2 per cent by volume at a temperature up to 89-90 degrees C. It is a crude extract contaminated by 0.21 per cent picric acid with a pH of about 2.0.

Controls have been subjected to intraperitoneal injections of a 0.21 per cent aqueous picric acid solution and similarly made impotent extracts without yielding the foregoing effects. Attempts are under way to refine this extract.

Conclusions

1. Thymus extract (Hanson) accelerates the rate of growth to puberty and maturity.

*All pineal extract used in this study was prepared in the Hanson Research Laboratory aided by a grant from the Josiah Macy, Jr., Foundation of New York City.

2. Pineal extract (Hanson) retards the rate of growth and accelerates the rate of differentiation, producing a precocious dwarf that is normal in appearance.

3. The injection of succeeding generations of parent rats has resulted in more marked demonstration of these effects.

4. The offspring of the third and succeeding generations in the thymus treated group reveal marked acceleration in the rate of growth and differentiation, while in the pineal treated group there is marked retardation in growth resulting in dwarfism, but, also, early differentiation.

5. Active pineal extracts cause early sexual stimulation as evidenced by early prolific breeding on the part of the female and enlargement of the gonads and frequent erections on the part of the male.

6. Excessive thymus activity in the early generations does not cause early cessation of breeding, nor did it cause shortening of the life span in the first generation under treatment.

7. An excess of pineal activity causes permanent dwarfism, whereas an excess of thymus active principle causes only prepubertal gigantism, the animals eventually leveling off at maturity.

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THE ROLE OF IRON IN THE TREATMENT OF ANEMIA*

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THE origin of our knowledge regarding iron is lost in pre-historic time. It was supposed to have been discovered by the gods, and information concerning the earliest use of iron is lost amid the myths and folklore of the ancients.

There are ninety-one Biblical references to iron, none of which mention iron as a therapeutic agent. From inscriptions and sculptures dating from the reign of the kings of the Fourth Dynasty it is believed that iron was known and used in Egypt about 3,000 years before Christ.

In the old annals of China mention is made that iron was discovered in that country about 2,900 years before Christ. The God of War, Mars, is supposed to have imbued iron with divine properties, and Greek mythology infers that iron was used in the treatment of injuries incurred during war.

The earliest authentic reference in history to the use of iron as a curative agent is found in the writings of Apollodorus, dating from about 2000 B. C. Iron rust scraped from an enchanted sword and dissolved in wine was used as the curative agent.

In the Ebers Papyrus, which dates from about 1600 B. C., mention is made of the use of iron as a drug. There are, however, no publications on iron therapy between this latter period and the contributions of Hippocrates. Beginning with Hippocrates, who frequently mentions iron in his writings, there are numerous articles on the value of iron published by eminent physicians of ancient, medieval and modern periods. During the first century of the Christian era iron seems to have enjoyed great popularity as a therapeutic agent. The Elder Pliny regarded iron rust as a valuable medicine. Nero's physician employed iron as one of the ingredients of his favorite concoction which he used to protect the Emperor's health.

Galen mentioned sulphate of iron, and used it for its astringent effect. Sydenham, the outstanding clinician of the seventeenth century,

frequently mentioned iron in his writings and is one of the first to recommend using it in large doses.

Boerhaave recommended infusion of steel in wine for the treatment of chlorosis. Thomas Willis, in the seventeenth century, was probably the first to state that iron could impart color to blood. Pierre Pomet published a complete history of drugs about 1720, in which he recommended iron for chlorosis. The dose, according to this author, should be from ten to forty grams per day. As early as 1713, according to Christian, Geoffroy demonstrated the presence of iron in the ash of blood. However, Menghinis is given credit by most investigators for the discovery of iron in the blood.

More than one hundred years ago (1832) Blaud published an article in the *Revue de Medicine Francaise et Etrangere* in which he introduced to the medical profession his immortal pill, for which we have no better substitute, and which probably enjoys greater popularity today than it did a century ago.

In 1886, Zaleski demonstrated that iron was distributed in almost every part of the body. The fact that human tissue obtained its iron from food was probably first demonstrated by Dastre and Floresco in 1890.

The work of Whipple and his collaborators placed iron therapy on a sound foundation. From an historical point of view it is most interesting to note that Whipple, Hooper and Robscheit-Robbins used in their early experiments the historical Blaud's pill of a century ago.

Physiologic Rôle of Iron in the Body

From 1850 to 1905 investigators of iron metabolism focused particularly on the question of absorption and elimination. Since 1908, the great majority of investigations deal with iron as the component of hemoglobin. More recently a number of interesting papers has been added to the literature regarding the non-hemoglobin iron fraction, and it is now generally considered

*Read before the annual meeting of the Minnesota State Medical Association, Minneapolis, June 25, 1935.

that the liver is the storehouse for all forms of iron.

Hemoglobin is a protein compound of the pyrrol group containing chromogen with an atom of iron. It is this atom of iron which gives the hemoglobin its physical characteristics and striking color. This fact has led to many investigations on the use of iron in red blood cell and hemoglobin regeneration. Heme, which is probably the basic pigment complex, is an iron compound existing in the tissues of the body probably combined with a nitrogenous base. Iron is bound in the body with chromatin, cytochrome, and in fact with all heme pigments and is probably an essential constituent of substances concerned with oxidation.

About 70 per cent of the iron in the body is in the form of blood hemoglobin. A hemoglobin of 20 per cent is necessary to maintain life. However, Wiggers states that in repeated small hemorrhages hemoglobin may be reduced to as low as 15 per cent before life is in danger.

The daily iron requirement of the body is small; ten milligrams is probably sufficient. The average daily intake of an adult is about fifteen milligrams a day. This normal intake of iron is in the form of organic compounds which are broken down during digestion.

Absorption takes place principally in the duodenum and the iron is transmitted by the portal blood to the liver, which stores a considerable portion for future use. The availability of this stored iron is in direct relation to the metabolism of the hemoglobin. The human organism hoards its iron, using the available supply many times. Iron from broken down red blood cells is repeatedly used in the hemoglobinization of young red cells. The route of excretion is chiefly by cells of the large intestines, while a slight amount is lost through the kidneys. The amount excreted in the feces is approximately 50 per cent of the average amount ingested in food.

Anemia is produced whenever insufficient iron is ingested or when the available supply within the body is depleted.

Wiggers³¹ states that "experiments on animals with controlled chronic anemias have given no evidence that increased quantities of iron exert any hemopoietic effect unless the iron reserve of the body is practically exhausted." This con-

clusion regarding animal experimentation is not accepted as applicable to man.

Bethell⁴ and his co-workers state: "Iron deficiency anemia results from a lack of sufficient available iron for normal hemoglobin formation. Such a lack may be induced by: (1) depletion of the iron reserve from continued blood loss; (2) inadequate intake of food iron; (3) improper absorption of the element from the alimentary tract, and, as a rare possibility, (4) from inability to utilize available iron."

According to these authors the term, "iron deficiency anemia" is based on the etiologic considerations with their therapeutic implication and in no sense denotes a constant clinical entity." This clinical syndrome includes the symptoms of low hemoglobin content as well as those of any associated pathology. In many cases the deficiency is due to an abnormality in the gastrointestinal tract preventing the proper utilization of iron.

The fact that iron is present universally in plants and animals and is a necessary constituent of hemoglobin, places this metal in a vital role in all forms of life.

At this point in the discussion of iron metabolism it is in order to mention the controversial subject of copper.

Elvehjem^{12,13} of the University of Wisconsin, after much experimental research, states that both iron and copper are essential for hemoglobin formation and that copper acts only in a catalytic capacity.

While copper cannot take the place of iron nor compensate for unavailable forms of iron, its function is to render the iron available after it has been assimilated.

There is considerable evidence to show that copper is an essential element of the diet and that in small quantities it is an adjuvant to iron. On the other hand, the ingestion of excessive amounts of copper is decidedly toxic.

Beard³ and his associates are also of the opinion that copper is the catalytic agent which allows the release of iron from the liver.

The Types of Anemia in Which Iron Is Indicated

Iron has been used in all types of anemia and is probably an efficient therapeutic agent, not only in the hypochromic anemias but also as an

adjuvant to the anti-pernicious anemia factor in the hyperchromic anemias. However, its primary role as a specific agent is in the iron deficiency anemias.

Minot and Heath have shown that hypochromic anemias are much more prevalent in adults than is generally supposed.

Iron in "iron deficiency anemia" due to continued blood loss seems to be as specific a therapeutic agent as the anti-anemic factor in pernicious anemia.

In those anemias due to inadequate intake of iron in food or from the improper absorption of the element from the alimentary tract, the administration of proper amounts of iron seems to be a necessity for production of red blood cells and hemoglobin regeneration.

The type of anemia in which iron seems to have its greatest therapeutic value is where the degree of hemoglobin loss is in excess of the loss of the red blood cells, in consequence of which we have a low color index, a low volume index and concentration of hemoglobin below normal; or, in other words, a true microcytic, hypochromic anemia. In this type of anemia, iron acts as a specific.

So long as the body remains in physiological equilibrium there is probably sufficient iron available from various food sources to prevent an iron deficiency anemia.

From a physiological standpoint and from clinical experience, we may say that a diversified diet supplies sufficient iron and copper for the maintenance of blood hemoglobin in a normal individual. However, when the body has exhausted its iron storage by food deficiency or by loss of blood or other factors leading to a secondary anemia, it is exceedingly doubtful if this iron storage can be reestablished and the hemoglobin maintained at a normal level on the iron available in the food intake. Such a condition usually appears in anemia of rapidly growing children and in adults with increased hemoglobin demands as in pregnancy and frequent menstruation. Under these circumstances the diet is too low in iron and must be supplemented by the administration of sufficient iron to restore and maintain the optimum level. If the patient has a normal amount of iron, feeding of food rich in iron has no effect in increasing the hemoglobin content.

Babies born of anemic mothers have a deficiency of iron storage in the liver during intra-uterine life and will be anemic. This anemia cannot be relieved by simply prescribing food rich in iron, but iron itself must be prescribed in sufficient amounts to restore the iron reserve.

Until quite recently it was thought that all the iron in food material could be utilized by the body; however, hematic iron, while available in food, cannot be assimilated.

In the treatment of anemias with very low hemoglobin content, foods rich in iron cannot supply enough of this metal to promote rapid regeneration and hemoglobinization of red blood cells.

It is not necessary to prescribe copper before it is determined that iron alone is ineffectual. If the patient fails to respond to adequate doses of iron it is reasonable to supply copper in the hope of obtaining a release of stored iron.

Therapeutics

A review of the literature shows that the style of usage of iron changes rapidly: at one period, organic iron; at another period, inorganic iron, and, as the pendulum swings, soluble iron and ferro and ferri salts of iron, even to the clinical use of so-called magnetic and inactive non-magnetic iron.

As important as iron is to life, it is amazing how little the body contains. According to Ottenberg, the total amount of iron in the human body is about 3.5 grams, or less than the weight of a five cent piece, and 2.5 grams of this iron is in the form of hemoglobin.

While the total amount of iron in the body is small, it is an element essential to life.

One of the important points which has recently been brought to the attention of clinicians is the necessity of prescribing iron in large enough quantities for the human body to absorb a sufficient amount.

It should be definitely stressed that to get a hemoglobin increase by the administration of iron it is necessary to give an enormously large daily dose in order that so small a quantity as one-quarter grain of metallic iron may be assimilated and used as a building stone for hemoglobin formation in anemia.

If it is correct to use the term "iron deficiency anemias" the reticulocyte response to iron may be due to the direct stimulating effect of

this drug on the hemopoietic system. While in severe forms of anemia following blood loss the reticulocytosis and red blood cell regeneration may be dramatic, the reticulocyte increase is not as great as the response following the administration of the anti-anemic principle in pernicious anemia nor is the return of the red cells to normal as rapid.

It is well known that only a small percentage of iron ingested is absorbed, and other routes of administration have been advocated but up to the present time the parenteral administration of iron has not proven therapeutically efficacious.

The clinician should bear in mind the content of metallic iron in the preparation he uses. Reduced iron contains 90 per cent, while ferric ammonium citrate contains only about 16 per cent of metallic iron.

It has been emphasized by Witts and Robscheit-Robbins that there is an optimum level at which iron may be stored in the body and also that there is an optimum dosage above which it is needless to go.

We should seek this optimum dose by the same criteria we now use when we administer the anti-anemic principle of liver for pernicious anemia. These criteria are the increase in reticulocytes, the increased number of red blood cells and the increased percentage of hemoglobin following the therapeutic use of iron.

The rapidity with which the hemoglobin and reticulocytes increase seems to depend upon the initial red cell count and hemoglobin estimation. When the count is very low and the hemoglobin is reduced to a greater extent we may expect a fairly marked and rapid increase in the outpouring of reticulocytes and hemoglobin under adequate dosage of iron. As we approach the normal level the increase is not so rapid. Therefore, the optimum dose may have to be continued over a long period. The reticulocyte response begins on the third to fifth day, reaching its height quickly and persisting for about seven days, slowly returning to its normal level.

It appears to be the consensus of opinion that the necessity for large doses of iron lies in the difficulty with which this metal is absorbed from the gastrointestinal tract.

It has been established that hydrochloric acid in the gastric contents favors the absorption of iron.

The exact mechanism by which iron produces an increase in hemoglobin and an increase in red blood cells is at present not definitely known. The weight of opinion is that in the administration of iron we are supplying a substance which is deficient and which cannot be synthesized in the tissues.

Iron can be administered effectively in all forms of the so-called secondary anemias, and the presence of definitely known causes of anemia, such as carcinoma and tuberculosis, is not a contraindication to the use of iron.

Individuals who have suffered from secondary anemia over long periods of time may require prolonged iron medication before the initial response is obtained.

The danger of overdosage with oral administration of iron is slight. The total daily dosage of iron is fractionated and the proper fraction administered at least three times daily, preferably at meal time.

It is confusing to search the literature for authentic information regarding the best preparation of iron to use. A multitude of preparations have been proposed. In fact, nearly every preparation of iron known to pharmacy has been administered, some authors advocating the ferrous salts, while others are equally emphatic in stating that ferric compounds are superior preparations. To the experienced physician it seems to make little difference which preparation of inorganic iron is prescribed provided it is given in adequate dosage with the proper distribution of the dosage during the twenty-four hour period.

Without attempting to enumerate all the preparations of iron which have been proposed, we may state that for practical purposes the following preparations in the order given are probably the best both from the standpoint of the tolerance of the patient and from the hemoglobin response and red blood cell regeneration.

1. Reduced iron or ferrum reductum which contains 90 per cent of iron, thus necessitating a daily optimum dose of 1.5 grams.

2. Ferris ammonium citrate which contains 17 per cent of iron and requires a daily dose of 6 grams.

3. Saccharated ferrous carbonate in powdered form which contains 15 per cent of iron carbonate and necessitates a daily dose of 10 grams.

4. Ferrous carbonate in the form of the historical Bland's pill which contains 60 milligrams of iron carbonate and requires a daily dose of seventeen pills.

Ferric ammonium citrate may be given in solution or in capsules and is well tolerated by children.

Saccharated ferrous carbonate is preserved with sugar and is non-irritating and non-astringent, which makes it an admirable preparation of iron.

Ferrous carbonate in the form of Bland's pill requires a large number to secure the optimum dose and is an excellent form of iron where frequent administration is necessary.

In patients who have active peristalsis or insufficient hydrochloric acid in the stomach, the frequency of dosage should be greatly increased even to the point of hourly doses so that iron may be present in the duodenum almost continuously.

If the clinician obtains a quick and dramatic response from the initial treatment with iron he may regard this as a good prognostic sign. The condition of the patient's gastrointestinal tract must be taken into consideration. Rapid transit through the gastrointestinal tract hinders absorption and requires repeated doses until the diarrhea has been controlled. Gastroenterostomies may not permit of sufficient iron being absorbed in the duodenum. If achlorhydria is present deficient absorption may occur.

From a review of the literature and from our personal experience it seems that the optimum daily dose of iron, as metallic iron, will fall between 1 and 1.5 grams daily. Therefore the percentage of iron in the preparations prescribed must be known in order that one may compute the proper dose of the preparation. The distribution of this amount during the day must be given careful consideration as repeated doses are more efficacious than a single dose.

Reduced iron is small in bulk and non-irritating and is a very satisfactory preparation.

Summary

In this brief summary of the knowledge of iron in the treatment of anemia, I have attempted to trace man's knowledge of this metal from its first historical mention to its present application as a therapeutic agent.

The metabolism of iron has been discussed with special reference to its physiological role in the formation of hemoglobin. We have attempted to summarize the present known facts in regard to the assimilation, utilization and excretion of iron.

A brief summary of the types of anemia with the response to be expected and the criteria of optimum dosage has been given. The preparations available, their efficacy and method and frequency of administration have been pointed out.

Conclusions

1. Iron is necessary to tissue metabolism.
2. Iron is necessary to hemoglobin formation and probably red blood maturation.
3. Iron is a specific therapeutic agent in the secondary anemias of the iron deficiency type.
4. Iron produces a definite reticulocyte response and hemoglobin increase in practically all types of anemia except pernicious anemia and in this disease it is an adjuvant to liver therapy.
5. The daily optimum dosage of metallic iron for the adult falls between 1 and 1.5 grams.
6. Fractionated doses spread over the day have been demonstrated to be more efficacious than a single daily dose.
7. The potency of a preparation in iron content may be measured by the reticulocyte, red blood cell and hemoglobin increase.
8. When the optimum dosage of iron has been reached increased dosage above this point has no effect.
9. There is little danger from over-dosage of iron when given by the oral route.
10. Iron has been proven an efficient therapeutic agent in the anemias of infancy and those anemias accompanying the physiologic states of pregnancy and menstruation.

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THE ROLE OF DRUG ALLERGY IN THE ETIOLOGY OF PRIMARY GRANULOCYTOPENIA*

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THE syndrome first described by Schultz,⁵¹ in 1922, under the name of agranulocytosis and by Friedmann,²² in 1924, under the name of agranulocytic angina has two principal clinical features: severe granulocytopenia and evidence of bacterial invasion of varying extent. For a time it was felt that bacterial invasion, resulting in angina and fever, was the primary manifestation and that the granulocytopenia was secondary to it and the result of overwhelming sepsis. Early studies of the etiology, therefore, were directed toward establishing various bacteria found in the mouth and throat or in the blood stream as the direct cause of the disease. More recently, however, it has been adequately established that granulocytopenia is the primary manifestation and that the bacterial invasion is secondary to and made possible by the extreme depression of the granular leukocytes. Consequently etiologic studies have been directed toward agents or mechanisms capable of a sufficiently selective effect on the granulocytes to produce a neutropenia of the type observed.

It was shown by Kracke³⁷ that it was possible to inject benzene into rabbits in such small doses that it exerted a selective affinity for granulopoietic tissues, leaving the erythrocytic and erythroblastic elements undisturbed. Larger doses of benzene produced inhibition of all cellular types. Arsphenamine also has long been known to pro-

duce bone marrow depression frequently, usually, however, with anemia and thrombopenia in addition to reduction in granulocytes. Dodd and Wilkinson¹⁷ reported a case of typical agranulocytic angina which followed sulpharsphenamine therapy and tabulated twenty-four cases from the literature. However, of these, only sixteen showed significant reduction of granulocytes and eight were recorded as having severe anemia in addition. Farley¹⁸ reported a series of cases of depressed bone marrow function following arsphenamine treatment, of which three presented the clinical picture of granulocytopenia. Groen and Gelderman²⁴ observed two cases in which the appearance of agranulocytosis so directly followed salvarsan treatment that an accidental relationship was felt by them to be untenable. Reports of blood dyscrasias following the use of various arsenicals, especially arsphenamine and neoarsphenamine are relatively common in the literature and the frequency of associated skin lesions is suggestive that an allergic drug reaction is present in many cases at least. Stratton⁵⁶ cited an extremely interesting case in which following the fourth injection of neosalvarsan the patient developed extreme pallor, sore throat, fever and leukopenia of 2,000 cells per c.mm. with 1 per cent granulocytes. Hemorrhagic bullæ appeared on the skin. After six days there was definite improvement and by the twenty-second day recovery was complete. One month after the reaction treatment was re-

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sumed using pentavalent tryparsamide instead of the trivalent neosalvarsan with no further trouble.

Granulocytopenia has been described following the use of stovarsol,⁶ after acetylarsone,¹⁰ and after pure inorganic sodium arsenite.⁶³ It has also been reported by several authors following the use of various preparations of bismuth.^{5, 44, 53, 60} Injections of certain preparations of gold salts have produced the clinical picture of malignant neutropenia.^{1, 2, 4, 9, 11, 21, 29, 32, 49} Vonkennel⁶¹ observed the agranulocytic blood picture after the injection of a gold oil, and made the significant observation that intense itching may be a premonitory symptom of granulocytopenia.

Many of the neutropenias which have been observed after administration of the drugs mentioned show accompanying anemia or pancytopenia which excludes them from the primary granulocytopenias if one is to regard the latter as a distinct disease entity, although the fundamental mechanism of production may be similar. The extreme leukopenia seen as a part of overwhelming sepsis, in aleukemic leukemia, aplastic anemia, certain metastatic bone tumors, and as the result of the direct myelotoxic action of certain drugs such as benzene in which the severity of the lesion varies directly with the amount of the drug ingested or encountered represents an entirely different phenomenon.

In 1933 we presented evidence⁴¹ to show that in certain instances at least the use of amidopyrine or amidopyrine-containing drugs directly preceded the onset of primary granulocytopenia so that an etiologic relationship to the disease seemed probable. To our last reported⁴² series of twenty patients of whom all but one (who took an unidentified drug) were known to have taken amidopyrine prior to the onset of illness, two more are added.

Case Reports

Case 21.—T. S., male, aged fifty. Until August, 1934, when he developed a corneal ulcer, there had been no illness. Subsequently, for the relief of pain, allonal (allyl-iso propyl barbituric acid plus amidopyrine) in an unknown amount had been taken at intervals over a period of four weeks. On October 2, 1934, he became acutely ill with a chill, sore throat and fever of 103°. When seen October 4 there was no definite angina, but the white cell count was 2,000 with granulocytes absent. He became steadily worse and died on the eighth day, no granulocytes having been found at any time.

Case 22.—S. B., a housewife, aged fifty-two, was admitted to the Milwaukee County Hospital for the third time December 1, 1934, because of chronic infectious arthritis of fifteen years' duration. Thyroidectomy had been done in 1919 and salpingectomy and appendectomy in the same year. In 1921 she had a sinus operation, in 1925 all teeth were extracted and in 1928 a tonsillectomy was done. From January 29, 1935, to March 12 she received amidopyrine gr. 10 (0.6 Gm.) daily and from February 2 to March 12 amytal compound gr. 10 daily in addition. On March 11 ulceration developed on the lower gum and sores appeared in the mouth, nose and vagina. The temperature, which had been between 98 and 99, rose to 100 and on March 12 the blood count showed 1,150 leukocytes with 100 per cent lymphocytes; erythrocytes 4,500,000; hemoglobin 68 per cent. She was given pentnucleotide 10 c.c. on March 13, and on March 14 the leukocytes were 2,250 with 94 per cent lymphocytes and 6 per cent monocytes. On this day, by error, she was given 10 gr. of amytal compound. The following day, March 15, her white cell count was 1,550 and on March 16 it fell to 700. She was given a transfusion of 500 c.c. of blood. On March 18 the white cell count was 1,800 with 9 per cent rods; 4 per cent segmented cells; 67 per cent lymphocytes; 18 per cent monocytes and 1 per cent eosinophils. During the next eight days the leukocytes gradually increased and on March 27 the white cell count was 6,300 with 64 per cent polymorphonuclears. On March 28 there was a chill and temperature rise to 104°. The following day the white cell count was 14,700 with 74 per cent polymorphonuclears; R.B.C. 5,200,000; Hb. 81 per cent. The temperature and white count remained high and on April 2 there was another chill, a temperature of 105° and evidence of pyelitis. On April 3 she developed thrombophlebitis in the right leg and the white cell count rose to 53,000 with 88 per cent polymorphonuclears; 10 per cent lymphocytes; 2 per cent mononuclears; R.B.C. 4,600,000; Hb. 88 per cent. On April 5 and 6 abscesses developed successively in the left and right thigh. On April 9 the white cell count was 19,000 and on April 16 was 27,100 with polymorphonuclear counts of 92 and 96 per cent respectively. On April 16 a perinephritic abscess developed and she died April 21 of septicemia.

In this patient not only did the use of amidopyrine directly precede the onset of granulocytopenia but a characteristic depression of the leukocyte count followed the erroneous administration of 10 grains of amytal compound after evidence of some clinical improvement had appeared. In spite of the severe neutropenia which followed, twelve days after the extreme granulocyte depression the onset of a septic infection was followed by a normal granulocyte response with marked leukocytosis. It seems obvious that no underlying bone marrow insufficiency could have played a rôle in the development of the acute primary granulocytopenia in this patient.

Other reports of the onset of primary granulocytopenia following the use of amidopyrine have continued to appear in the literature and at the

present time thirty-three authors have reported that the use of amidopyrine or amidopyrine-containing drugs preceded the onset of the disease and apparently was a causal factor in 163 out of 263 patients reported by them (Table I). In addition other drugs were reported as having a known or probable causal relation to the onset in thirty-nine additional patients, bringing the total number in this group in which a drug etiology was probable to 202.

Jackson and Parker³¹ have pointed out that the mere use of a drug directly prior to the onset of illness is by no means satisfactory evidence of a causal relationship. While in seven of the twenty-seven cases studied by Jackson³⁰ amidopyrine seemed definitely related to the onset of granulocytopenia, eight other patients "had taken amidopyrine or allied compounds in considerable quantities, yet it could be shown in these instances that the therapy had not the slightest causal relation to the actual disease" since recovery took place in spite of continued administration of the drug.

We are entirely in accord with this attitude. However, it must be emphasized that positive demonstration of a causal relationship is our immediate concern and the accumulated evidence leaves little room for doubt that amidopyrine and certain other drugs, all of which are known to be frequent causes of allergic drug reactions, can produce in sensitive individuals the clinical picture of primary granulocytopenia. This allergic drug reaction represents an entirely abnormal response to the drug and is not in any way a heightened physiologic response. While benzene and similar leukotoxic drugs are capable of producing bone marrow depression in normal toxic doses, the mechanism responsible for the appearance of primary granulocytopenia following drug administration is entirely different. In many instances there is a history of long continued use with no ill effect, and then, after a temporary cessation of use, readministration of a relatively small amount of the drug is followed by the dramatic onset of the disease.

We have previously reported⁵⁵ recurrences of granulocytopenia in two patients both of whom had developed the disease following the use of amidopyrine. The first patient, a physician, had been in the habit of using allonal (allyl-isopropyl barbituric acid with amidopyrine) frequently for insomnia. Following recovery in No-

vember, 1931, from the original typical granulocytopenia he had two sharp recurrences on May 17 and July 5, 1932, each of which was later found to have immediately followed the taking of amidopyrine. After an interval of ten months during which time the white count remained normal, a single 5 gr. tablet (0.3 Gm.) of amidopyrine was taken. Within three hours there was deep seated bone ache, malaise, fever of 102° and a rapid fall in granulocytes to 250. Subsequently the count gradually rose to reach the normal level within six days. On December 12, 1932, a patch test using a 10 per cent suspension of amidopyrine was applied to the un-abraded skin. Twenty-four hours later he complained of tiredness, aching of the bones, chilly sensations and his temperature was 102°. The patches were immediately removed and at this time the white count was 5,450. Four hours later it was 3,550 and the following morning, thirty-six hours after the patches were applied, it was 2,700. During the next forty-eight hours the count gradually returned to the normal level of 7,200.

Similar results were reported in a second patient with chronic infectious arthritis who developed granulocytopenia while under observation in the Milwaukee County Hospital after medication with amytal compound (amytal with amidopyrine). Following recovery, recurrences were induced by giving a single 10 gr. capsule of amytal compound, by a 5 gr. tablet of amidopyrine alone, and by the application of an amidopyrine patch test to the unabraded skin. Administration of amytal alone was followed by no change in the total or granulocyte count.

Grant²³ reported a patient with arthritis who had taken amidopyrine regularly for several months and discontinued the drug on admission to a hospital for cholecystectomy. During convalescence she was given a sedative containing amidopyrine and a few hours later had a chill, followed by unexplained fever. No blood count was made. A few weeks later she again took amidopyrine and immediately had a chill and rapid rise of temperature. On the following morning her leukocyte count, which had been normal four days previously, was 2,000 with 2 per cent granulocytes.

de Vries¹⁶ patient had four recurrent attacks each in connection with the use of amidopyrine or amidopyrine-containing preparations. On one

TABLE I. GRANULOCYTOPENIA FOLLOWING AMIDOPYRINE MEDICATION

Author	Reference	Total Cases	Preceded by Amidopyrine Alone or Combined	Preceded by Other Drugs	Remarks
Anderson, S.....	3	1	1		
Benjamin & Biederman.....	7	1	1		Recurrence on readministration.
Corelli, F.....	12	2	2		
Costen, J. B.....	13	3	2		
de Vries, S. I., Jr.....	16	1	1		Four recurrent attacks, each after amidopyrine.
Fisher, J. H.....	19	1	1		
Fitz-Hugh, T. Jr.....	20	26	17		
Grant, S. B.....	23	1	1		
Groen & Gelderman.....	24	20	14	6	
Hench, P. S.....	25	1	1		
Hoffman, Butt & Hickey.....	27	14	13	1	One case developed under observation.
Holten, Nielsen & Transbol.....	28	6	6		All developed under observation.
Jackson, H., Jr.....	30	27	7		Eight others continued to take amidopyrine during acute illness without apparent harm.
Johnson, W.....	33	1	1		Two recurrences after amidopyrine.
Jorgensen, H. K.....	34	1	1		
Knudson, O.....	36	1	1		
Kracke & Parker.....	38	11	6	5	
Larsen, B.....	39	1	1		
Madison & Squier.....	42	23	21	2	Recurrences after patch tests and after ingestion in two.
McGuire, J.....	40	1	1		
Moltke, O.....	43	1	1		
Phillips, E. W.....	45	3	3		
Plum, P.....	46	7	7		Symptoms reproduced on readministration in one.
Randall, C. L.....	47	1	1		Developed under observation.
Rawls, W. B.....	48	2	2		Recurrence on readministration in one.
Roche, F. W.....	50	1	1		Recurrence on readministration.
Seeman, H.....	52	36	13		Amidopyrine not given in fifteen.
Sturgis & Isaacs.....	57	9	7		Neutropenia induced on readministration in three patients.
Videbech, H.....	58	1	1		
von Bonsdorff, B.....	59	3	3		
Watkins, C. H.....	62	53	22	25	Recurrences after barbiturates.
Zinberg, Katzenstein and Wice....	64	1	1		Recurrence on readministration.
Zininger, P.....	65	2	2		
TOTAL.....		263	163	39	

occasion the onset of a new attack occurred with a chill which followed within a few hours the use of the drug.

Benjamin and Biederman⁷ gave their patient 10 gr. of amidopyrine seven months after recovery. One hour after the drug was taken headache, nausea and backache developed gradually followed by fever and a fall in the leukocyte count from the previous level of 3,700 to 1,700 at the end of three hours. On the following day the count was 1,000, after which it gradually rose to 4,400 on the fifth day and 5,200 on the ninth day. Similar administration of aspirin or allurate (allyl-iso-propyl barbituric acid) caused no change in the count, and intra-

cutaneous, patch tests and passive transfer tests with aspirin and amidopyrine were all negative.

One of Rawl's⁴⁸ patients who had developed neutropenia after taking amidopyrine returned to normal nine days after the drug was omitted, without any other form of treatment. After a period of rest resumption of amidopyrine was again followed by neutropenia after about 280 grains (18.2 Gm.) had been taken, and again with omission of the drug the leukocyte count returned to normal in eight days.

Zinberg, Katzenstein and Wice⁶⁴ observed the onset of granulocytopenia after the use of amidopyrine in a patient who had recovered from pneumonia. After uneventful recovery from the

granulocytopenia; 5 gr. of amidopyrine was given at 1:30 p. m. At 2:45 p. m. the patient had a severe chill lasting fifteen minutes with a subsequent rise in temperature to 101.4° F. At 2:55 p. m. the white count was 4,600 and at 3:45 p. m. was 1,300. The following day it was 2,200 and by the fourth day had returned to the normal level of 7,800.

Plum⁴⁶ reproduced the clinical picture of granulocytopenia in a patient whose original attack had followed the use of amidopyrine combined with diallylbarbituric acid. After the white cell count had returned to 9,020 with 63 per cent granulocytes 0.2 Gm. amidopyrine was given by mouth. An hour after the drug was taken the patient felt indisposed and there were "shiverings" of the extremities aggravated during the next six hours. At the same time there was elevation of temperature. One and one-half hours after taking the drug the white cell count fell to 1,900. This initial fall was followed during the next three hours by a rise to 11,500, after which the count again fell during the next 24 hours, at first rapidly and then more slowly, to 2,000 cells per c.mm. Through the next eight days the count gradually increased to reach 10,400 on the tenth day.

Roche⁵⁰ administered a single 5 grain tablet of amidopyrine to a recovered patient whose initial granulocytopenia had followed the use of this drug. Within an hour there was a chill, elevation of temperature and a fall in the white count from the previous normal level to below 2,000 cells per c.mm. A gradual, uneventful return to normal followed.

Sturgis and Isaacs⁵⁷ reported oral administration of amidopyrine in a dose of 0.3 to 1.0 Gm. to three of their recovered patients. A drop occurred in the total and granulocyte count in each of the three patients and with two of them the test was repeated with similar results. One patient who showed a drop with amidopyrine failed to do so when tested with 0.3 Gm. of barbitol.

Allergic drug reactions are known to occur after the use of barbiturates. We personally have observed no cases of granulocytopenia following the use of these drugs. However, Watkins⁶² has reported seventeen cases in which barbiturates alone were used prior to the onset of illness. Eight patients had taken amytal or sodium amytal. One patient who had recovered from an attack "probably induced by amido-

pyrine" developed a typical recurrence within 48 hours after receiving amytal for insomnia. Four months later, of her own accord, she took 6 gr. of sodium amytal for insomnia and a third granulocytopenic phase developed from which she died in twelve days. Another patient who had recovered from two attacks each apparently induced by amytal four months later took of his own accord 1½ gr. of amytal. Within thirty-six hours the leukocyte count had dropped to 1,800 with 1 per cent neutrophiles. Rapid recovery followed. Seven patients in Watkins' series took pentobarbital sodium prior to the onset. All seven of these patients were known to have had normal blood counts prior to use of the drug and no other drug was taken. Two patients took phenobarbital and one had a dermatitis in association with the leukopenia. One patient had taken acetanilid; six took an unknown sedative for headache, and six patients, all of whom recovered, gave no history of drug usage prior to the onset of the granulocytopenia.

Following the introduction of dinitrophenol and its rather wide use for weight reduction this drug also has appeared in apparent etiologic relationship to the onset of granulocytopenia. Hoffman, Butt and Hickey²⁷ reported granulocytopenia with recovery in one of their patients after two weeks ingestion of the drug. Silver⁵⁴ reported a fatal case in which dinitrophenol was taken before the onset, but causal relationship was not positively demonstrated. Two additional cases were reported by Damoshek and Gargill,¹⁴ one case was reported by Davidson and Shapiro,¹⁵ one by Watkins⁶² and one by Bohn.⁸ We have recently observed an additional case in which dinitrophenol was taken prior to the onset of the illness, but as yet we have not felt it safe to verify the causal relationship by ingestion or patch tests.

The extreme difficulty of obtaining an accurate history of medication preceding the acute illness was well illustrated by this case. During the acute period and for some time after recovery the patient constantly maintained that no drugs whatever had been used and it was only after repeated questioning that the use of dinitrophenol was admitted. The futility of attempting to obtain a history of previous medication months or years after an attack of granulocytopenia is obvious.

This rapidly growing evidence from independent observers leaves no room for doubt that a single small dose of certain drugs, especially amidopyrine, will, in the sensitive individual, produce a profound fall in both the total and granulocyte counts and, in the more severe reactions, the clinical picture of primary granulocytopenia. Kracke and Parker³⁸ have advanced the hypothesis that the depression of the granulocytes after amidopyrine and similar medication is the result of a direct toxic action on the bone marrow of some of the oxidation products derived from benzene and they were able by the use of such oxidation products to depress the leukocyte count in an occasional rabbit to as low as 1,000 cells per c.mm. Because among the thousands of persons taking "benzamine" drugs such as amidopyrine only the occasional individual is affected, they assumed "the existence of a previously weakened, damaged or idiosyncratic bone marrow." If this assumption were true then it would seem logical to expect a person who had had granulocytopenia due to amidopyrine subsequently would show a marked leukopenic reaction when given drugs such as arspenamine, acetanilid or phenacetin which they have shown ultimately yield these common oxidation products. We have observed no such reaction, at least after the use of phenacetin by some of our patients. Furthermore our recovered cases have shown subsequently an entirely normal bone marrow response without evidence of impairment in function as long as the drug concerned was avoided. Herz²⁶ has intimated that the granulocytopenia following amidopyrine resulted from the toxic effect of the imido (NH) radicle, derived from phenyl hydrazine, which resembles the latter in its rapid reduction of granular leukocytes in the blood stream. This conception again presupposes direct toxic action on the bone marrow for which there is no supporting evidence.

We believe that the neutropenias seen following the use of amidopyrine and similar drugs are the result of an allergic drug reaction and not to a heightened pharmaceutical or physiological response. The frequently associated chill and temperature rise are common symptoms of allergic drug reactions in general³⁵, and it is also well known that in such reactions leukopenia is often present just as in serum disease. The ex-

tremely minute amount of drug effective in producing a reaction after the application of patch tests in two of our patients, together with the absence of acceptable evidence of bone marrow damage in the thousands of persons who have taken amidopyrine without the slightest evidence of ill effect, can be explained on no other basis. How such sensitivity develops and whether the sensitivity is temporary or permanent are questions that can not be answered at the present time. Just as varying degrees of sensitivity to proteins are observed clinically in atopic diseases, sometimes being so great that even a cutaneous test results in a violent general reaction and at other times so mild that only massive contact will upset allergic equilibrium and cause symptoms, so we believe varying degrees of sensitivity may exist to amidopyrine and similar drugs. Skin tests in drug hypersensitivity are usually negative but as in all allergic phenomena negative skin tests do not exclude the existence of the hypersensitive state. In our two patients a slight hyperemia was noted from the amidopyrine patches, definite enough to be correctly read by three independent observers, but thus far corroborative positive reactions have not been obtained by others, and no one has obtained positive tests after passive transfer.

We know of no way of recognizing in advance those individuals who may develop drug idiosyncrasy. However a history of drug intolerance of any kind demands increased vigilance. We have seen two patients who gave a history of aching in the legs, malaise and general discomfort after taking amidopyrine sufficiently pronounced that its use had been discontinued by both. Unfortunately, permission for blood studies after experimental ingestion of the drug could not be obtained. The well known fact that sensitivities can and do develop to many valuable drugs such as aspirin, morphine, quinine, salvarsan, etc., by no means precludes their use. Recognition of the fact that such idiosyncratic reactions are possible should simply be an added safeguard for intelligent use. Because of the undoubted frequent association of granulocytopenia with amidopyrine medication repeated blood counts and close observation of clinical symptoms are absolutely essential during administration of this drug and we feel strongly that the use of amidopyrine or drugs of

a similar nature during acute primary granulocytopenia is absolutely contraindicated, even though the clinical evidence in a given case may not seem to indicate any direct relationship to the onset of the disease.

Summary

1. At the present time thirty-three authors have reported the use of amidopyrine or amidopyrine-containing drugs preceding the onset of acute primary granulocytopenia in 163 out of 263 patients, while other drugs had a known or probable causal relation to the onset in thirty-nine additional patients, bringing the total number in the group in which a drug etiology was probable to 202.

2. Granulocytopenia following drug administration must be the result of an allergic rather than toxic response since the drugs concerned have been taken by normal individuals in massive doses over long periods of time with no observed effect on the total or granulocyte counts, and the incidence of primary granulocytopenia is extremely low as compared to the widespread use of these drugs. Furthermore granulocytopenia has been elicited repeatedly in recovered amidopyrine-sensitive patients by readministration of amounts of the drug so minute that a toxic action is inconceivable. In addition, the severity of the granulocytopenic reaction and subsequent recovery of normal granulopoiesis does not seem to bear any direct relation to the amount of drug used. Patients who have recovered show a normal bone marrow response toward subsequent ordinary stimuli and do not have recurrences unless a specific drug to which hypersensitivity exists is taken again.

3. Just as the allergic reaction to aspirin results most frequently in hives or violent asthma, so it appears that the allergic reaction to amidopyrine is especially manifested by extreme neutropenia. The same granulocytopenic reaction, however, can and does occur to other drugs, and possibly to some protein allergens as well. When such is the case, administration of amidopyrine during the disease or after recovery has no effect on the granulocyte count.

4. The extreme difficulty of obtaining an accurate history of medication preceding the acute illness even at the time of illness, and the absolute futility of attempting to determine accurately such a history from hospital records, are

apparent. Countless preparations are marketed under names giving no suggestion of their amidopyrine content.

5. The very nature of the allergic drug reaction with its associated malaise, deep-seated bone ache and fever is such that readministration of anodynes such as amidopyrine is usual. Amidopyrine and allied drugs are chiefly dangerous, therefore, when the possibility of the allergic reaction is not recognized. In the normal individual they may be used with safety, but their use requires close clinical observation checked by blood counts for evidence of hypersensitivity, and immediate avoidance of the drug if even suggestive neutropenia appears. Self medication obviously is especially hazardous. Although we recognize that certain patients can take amidopyrine during acute primary granulocytopenia without apparent ill effect, it is our opinion that drugs of the amidopyrine type should never be employed during the acute phase of the disease.

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THE LABORATORY DIAGNOSIS OF THE VARIOUS FORMS OF DYSENTERY*

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ALTHOUGH various forms of dysentery were clearly described by Hippocrates and probably existed for centuries before the time of Christ, knowledge of these conditions really dates from the discovery of the group of dysentery bacilli first reported by Shiga in 1898. Although amebas had been found before this time, and although Koch, in 1883, had been impressed with their presence in intestinal ulcers, it was not until Shiga's discovery that it was possible to make definite scientific headway in study of dysentery. In spite of the work of Kartulis, Councilman and Lafleur, Schaudinn, and others,

knowledge of dysentery was rather chaotic until about 1913.

By the term "dysentery" one means a symptom-complex identified by characteristic stools and characteristic pain. The stools are small, are frequently passed, and contain mucus which is usually greenish yellow or dirty brown, because of the altered blood that is mixed with it. The mucus may be mucopurulent, there may be streaks of blood on it, or spots or pools of blood may be present. The masses of mucus may be suspended in serous, sanguineous or fecal material, and sometimes the discharges are watery. Although, as compared with the stools of dysentery, diarrheal stools are as a rule more copious and passed less frequently, they may, and often

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do, contain microscopic or occult blood and some mucus. The distinction, although evident in typical conditions, is more artificial than real in some others and frequently dysenteric stools alternate with diarrheal stools.

Blood resulting from hemorrhoids and anal fissures may sometimes confuse the examiner. Its very fresh appearance, its ability to clot, the history of the patient, and physical examination of the rectum and anus must be taken into account in determining the true significance of the presence of such blood.

The characteristic pain is termed "tormina" and "tenesmus." Tormina, the griping, colicky pain which centers about the umbilicus, is more likely to accompany lesions about the cecum, while tenesmus is increased as the lesions encroach on the rectal region. This painful, spasmodic contraction of the anal sphincter gives the feeling of incompleteness of defecation, and leads to straining, which justified Manson's expression "glued to the commode."

Frequently the only means of positive diagnosis of the type of dysentery is laboratory examination of the discharges of the patient, and no group of diseases requires more co-operation between the laboratory and the clinician. I shall confine my discussion to clinical laboratory procedures which are direct and practical and which have been fairly well standardized.

Chronic Ulcerative Colitis

One is limited entirely, from the laboratory standpoint, to a study of the feces in the diagnosis of chronic ulcerative colitis. As a rule, the patient's bowel movements are frequent and foul smelling. They are characterized by the presence of a large amount of pus, which frequently can be detected with the unaided eye from its grayish white appearance. The feces may or may not contain gross blood, and sometimes the blood may be bright red, indicating hemorrhage near the rectal region; there is a minimum of mucus. The movement as a whole is typically soft and unformed but not watery. Microscopically, the large amount of pus and relatively small number of erythrocytes are striking; Charcot-Leyden crystals are, almost without exception, abundant.

Whether it is correct to state that a diagnosis of chronic ulcerative colitis is justified when the

diplococcus described by Bargaen is found in the feces or is obtained from the ulcers is still a matter to be conclusively settled. The organism has been found and reported by others in a variety of conditions, but it is certainly found in a large percentage of cases of chronic ulcerative colitis, and, because it adds some weight to the diagnosis, it should be sought. If vaccines or serums are to be used for treatment the organism must be isolated.

The best procedure is to obtain material from a rectal ulcer, through the proctoscope. Sterile cotton swabs on long applicators should be prepared and the ulcer swabbed out after the patient has used a cleansing enema. The swabs should be placed immediately in tall tubes of glucose brain-broth. If one is unable to obtain material in this manner, swabs should be taken from the pus of a freshly passed stool. After the tubes have been incubated at 37.5° C. for four to six hours, three additional tubes should be inoculated from each original tube by shaking out the swab in each tube successively, leaving it in the last one. This makes a set of serial dilutions. One set of tubes, inoculated with one swab, is now heated in a water bath for forty-five minutes, at 55° C., in order to kill Gram-negative bacilli, for it has been found that the diplococci are fairly thermostable. All the tubes are now incubated for eighteen hours, after which a Gram-stained smear is made and examined from each of the eight tubes. From this study, one or more tubes are selected on the basis of which tubes contain most Gram-positive diplococci; the others are discarded.

From these selected tubes, blood agar plates are poured by the following method: A capillary drop of brain-broth culture is mixed with 10 c.c. of physiologic solution of sodium chloride and from this mixture a capillary drop is taken and is placed in 10 c.c. of melted blood agar; then several dilutions are made from this mixture, pouring the plates and incubating over night. The colonies of diplococci will be very small and translucent, often surrounded by a green zone in which is a suggestion of slight hemolysis. Several of these colonies should be fished, transferred to brain-broth, and incubated for eighteen hours. Smears should be made from the cultures and examined; if they contain typical Gram-positive diplococci, composed of lancet-shaped organisms, the organisms may be con-

sidered the same as those described by Bargen. They can be further identified by being agglutinated by immune serum, and by observing that they ferment dextrose, lactose, maltose, saccharose, raffinose and sometimes salicin. The final test, according to Bargen, is to produce typical lesions in an experimental animal by intravenous injection.

Intestinal Tuberculosis

Although many attempts have been made to devise laboratory methods to detect the presence of tuberculous ulcerations in the bowel, but little information can as yet be obtained from such tests. Hardly had the organism been described by Koch than Lichtheim had observed that bacilli of tuberculosis could be found in the feces as frequently as in the sputum, but he held that they occurred in the stools only if patients had intestinal tuberculosis. From this time on, numerous investigators have studied the relation of pulmonary tuberculosis to the finding of bacilli in the feces. It must be borne in mind that acid-fast bacilli occur in the feces of normal individuals, and that at least some of these are similar in shape to bacilli of tuberculosis. It has been demonstrated by cultural and experimental methods that these are not *Mycobacterium tuberculosis* but it is frequently impossible to distinguish them from *Mycobacterium tuberculosis* by examination of smears.

As long ago as 1896, Biermann advanced the view that finding bacilli of tuberculosis in the feces was of no value toward establishing the diagnosis of intestinal tuberculosis, but his paper was overlooked by many who have followed, and much energy has been expended in trying to correlate the finding of bacilli in the feces with clinical findings. Philip and Porter, in 1910, after studying ninety-nine persons who had pulmonary tuberculosis, found acid-fast bacilli in the feces of 75 per cent, and in the same year Alexander found bacilli of tuberculosis in the feces of thirty-eight of forty-five cases of pulmonary disease. Engleson studied sixty cases and found bacilli in the sputum in forty-one, in the feces in forty-four, and in the rectal mucus in fifty-seven. Nüssel and others have shown that bacilli can be found in the feces in practically every case of pulmonary tuberculosis if proper methods are employed. Indeed it is claimed that one can often find *Mycobacterium tuberculosis* in the

feces before it is found in the sputum in some cases of pulmonary tuberculosis. Not only are the bacilli swallowed but many are eliminated into the bowel with the bile.

It becomes evident, therefore, that finding bacilli of tuberculosis in the feces does little to establish the diagnosis of tuberculous enteritis. For finding such bacilli in feces it is best to concentrate the material by the Reh method, which consists of taking a piece of feces, from 1 to 2 gm. in weight, mixing it with enough water to make it half fluid, then adding ether and shaking. The ether is poured off, centrifuged, and a smear of the sediment is stained.

The gross appearance of the stool in cases of intestinal tuberculosis gives but little help, but a frank intestinal hemorrhage, if a person has tuberculosis, should make one very suspicious of ulceration in the bowel. Many workers have observed that usually, if ulceration is present, either microscopic blood or occult blood can be demonstrated. The benzidine test should be used, with a thorough understanding of the limitations of the test. The patient should be on a meat-free diet for seventy-two hours before the test. To perform the test a gram of feces should be emulsified in at least 10 c.c. of ether and the ether discarded. The feces should next be extracted with 5 to 10 c.c. of a mixture half of glacial acetic acid and half of ether, and the supernatant fluid filtered. To the filtrate is added about 50 mg. of benzidine, freshly dissolved in 1 c.c. of glacial acetic acid and immediately followed with 1 c.c. of hydrogen peroxide. If occult blood is present, even in a trace, a blue color will form within thirty seconds. This test is very delicate and if positive is highly suggestive of intestinal ulceration when the patient suffers from a tuberculous condition, provided he is not swallowing blood from the lung. Few have studied the presence of pus in feces in tuberculosis but Pritchard found it in thirty-two of his forty-five patients who had intestinal ulcerations. If pus and *Mycobacterium tuberculosis* are both found in a stool, and if the test for occult blood is positive, a presumptive diagnosis of tuberculous enteritis seems justified.

Food Poisoning

Few conditions encountered by general practitioners are as puzzling as sudden onsets of violent diarrhea or dysentery. Most of these go

undiagnosed as to etiology and many are of short duration. When the upset is but moderately severe, and lasts but a day or two, the common diagnosis is "something you ate"; in the light of present knowledge the diagnosis is competent. Nevertheless, more definite information is available at present. In many cases, the symptoms of gastro-enteritis are attributable to some form of food poisoning and are caused by various bacteria of which the staphylococci form a prominent group.

As a cause of food poisoning, staphylococci were first recorded in the literature by Barker, in 1914, and the evidence was critically analyzed. The cases occurred on a farm in the Philippines, and the patients had drunk the milk from a certain cow, after the milk had been kept at room temperature. The fresh milk did not cause illness. Sixteen years later Dack reported a similar outbreak in Chicago, caused by a yellow staphylococcus isolated from samples of cake. Bacteria-free filtrates, in amounts of 2 to 10 c.c., produced violent gastro-enteritis in volunteers. Since then many similar occurrences have been recorded and the organisms have been isolated from other foods: chicken gravy, devil's food layer cake, and chocolate éclairs.

The staphylococci have been yellow, and numerous volunteers have demonstrated that toxin derived from these organisms produces typical symptoms, as does the toxin when fed to rhesus monkeys.

Unfortunately it is almost impossible to make a laboratory diagnosis by examination of the patient or his feces, since living organisms may not be present; they may have been killed by heating the food. Even if living organisms are present in the feces the chances of obtaining them and proving their pathogenicity is slight. The only means of positively establishing the diagnosis is to obtain samples of the food eaten, and from them to isolate a yellow staphylococcus which produces typical toxin. In the past the toxin has been tested on volunteers, but by carefully controlling the reaction of the stomach of a guinea pig to a pH of 7.3, uniform results can be obtained on that animal. Usually several persons are affected, since foods are usually shared, and this of itself helps in the etiologic diagnosis.

A number of other bacteria have been identified with food poisoning which is evidenced by gastro-enteritis, and by violent diarrhea or dysen-

tery, with abdominal pain. Most prominent among these bacteria are *Salmonella enteritidis*, *Salmonella aertrycke*, and *Salmonella schottmuelieri*. Usually these outbreaks occur in the summer months, when the bacteria have a better chance to multiply in the foods most often involved, which are meats, including shellfish and fish. These foods may be infected in their original state, or they may be contaminated in handling, especially by carriers, or even by the deposits of rats and mice; these rodents apparently act as carriers of these bacteria.

The diagnosis is established bacteriologically by study of the food in question, of the vomitus and feces of the patient, and of the blood, spleen, liver, and intestines of those who die of the infection. As a rule, the organisms do not persist in the vomitus or feces longer than a month or six weeks, and frequently they can be obtained only at the beginning of the onset. Isolation of the organisms is performed along the same lines as will be discussed in regard to typhoid fever. All forms of these organisms do not ferment lactose, and their fermentations of other sugars are quite characteristic. However, if the paratyphoid organisms are involved, agglutination tests will be useful in identifying them.

Bacillary Dysentery

As a rule bacillary dysentery is rarely seen in the Northwest; yet it is encountered enough to be considered in any general discussion of dysentery.

Last summer, at The Mayo Clinic, as elsewhere in this region, a relatively large number of strains of dysentery bacilli were isolated from patients who had dysentery and relatively severe diarrhea. One can expect to encounter a number of different types of dysentery bacilli (*Shigella paradysenteriae*) which cause this malady, such as the Flexner, His-Russell, and Sonne types. So far Shiga's organism (*Shigella dysenteriae*) has not been encountered in this part of the country.

The organisms are isolated from the stool in a manner similar to that in which typhoid bacilli are isolated, with one important modification. Inoculation from the stool must be made promptly; as Colonel Craig once said, "The patient should be removed from the bedpan in order to inoculate media, preferably at the bedside." As

a matter of fact not more than thirty minutes should elapse from the passage of the stool until the inoculations are made, since the organisms apparently undergo autolysis on standing. The final determination of the exact species of dysentery bacilli is made on the basis of specific fermentation reactions and agglutination tests.

The typical stool contains pus, a great deal of mucus, is liquid, even "rice water-like," and may contain blood. Large macrophages are almost always present, and may be easily confused with amebas, for often the macrophages contain erythrocytes. Their nuclei are, of course, distinguishing, and their motion, when present, is not like that of *Endamoeba histolytica*.

The nuclei can be demonstrated easily by making a Gram stain, or with methylene blue. Amebas do not stain well by these methods, while the macrophages stain very well.

One has a much better chance of obtaining the bacilli from a stool containing blood and mucus than from any other type of movement.

It is important to note that cultures of blood and urine are almost always negative, since the organisms very seldom invade the blood stream. However, positive agglutination tests, usually at low titer, rarely as high as 1:500, are obtained after from six to twelve days of illness and may persist for several months. The test is not considered very reliable for diagnosis.

Typhoid Fever

Although typhoid fever is not classified as a form of dysentery, in a third of the cases, during the first half of the illness, or beginning in the third week, more or less severe diarrhea may occur, with or without passage of blood. This, together with the tenesmus that is frequently present, makes it necessary to distinguish the disease from the more typical dysentery.

In this state, largely through the work of the State Board of Health, there has been a considerable reduction in the incidence of typhoid fever. In large measure this has been attributable to unrelenting energy in finding carriers, in particular the food-handler carrier, and in protecting others from them. Last year, however, the number of cases reported in the state was not in line with previous years. Thus, there were 217 cases in 1930, 193 in 1931, 165 in 1932, 136 in 1933, and 153 in 1934. On the basis of the

four previous years, there should have been but 109 cases in 1934 instead of 153. Perhaps this rise was attributable to the peculiarly dry summer, with its high temperatures. Incidentally the mortality for the period of five years has been 10.5 per cent.

The diagnosis of typhoid fever, from a laboratory standpoint, is most satisfactory. In the first week one should expect to obtain positive blood cultures in almost every case. The earlier the culture is taken, the more likely the chance of obtaining the organism. Blood should be poured, with agar, into Petri dishes, in varying dilutions, and should be incubated for forty-eight hours if still negative at the end of twenty-four hours. Usually the colonies appear slowly, and more cultures are positive after thirty-six hours than before. If the organisms are Gram-negative, and especially if they are motile, they should be tested in sugar fermentation tubes and their identity verified, if necessary, by specific agglutination tests. After the first week the incidence of positive cultures falls, and in the fourth week it is not more than 15 or 20 per cent.

Evidence based on the Widal test can be obtained beginning with the third day, when in about 15 per cent of cases the test is weakly positive. During the second week more than 80 per cent of patients give positive agglutination tests in a titer as high as 1:100. An important feature in diagnosing typhoid fever is the increasing titer of agglutination during the illness. In these days, when typhoid vaccine is used so frequently, a Widal test is not so diagnostic as it formerly was, and it is often necessary to repeat the test and to demonstrate a rising titer before its significance can be determined.

With the appearance of an adequate agglutination titer the rose spots are seen, and from them the organism can be isolated, although rarely is it indicated, from a diagnostic standpoint, to attempt to isolate the organisms from these spots.

The organism can be isolated from the stool or urine in about half the cases during the first two weeks, but more frequently during the third, when the ulcers begin to break down. I have found that the most satisfactory method is to inoculate 1 c.c. of physiologic saline solution with a loopful of feces, and to incubate the mixture for thirty minutes. From the top layer a loopful is spread out on an Endo plate, and this is incubated in the dark for twenty-four hours.

Suspicious white colonies are fished and grown for eight hours in a tube of sugar-free broth, and from this sugar fermentation tubes are inoculated. The characteristic reactions are read at the end of twenty-four hours, and the cultures also can be tested with specific serums, for agglutinations. Urine is treated in a similar manner, except that no dilution in saline solution is necessary, and no preliminary incubation is done.

It is easier to isolate the organism from duodenal content than from the stool and it should be remarked that it is not a simple matter to obtain the organism from the stool or urine. This requires experience and skill, and attempts are frequently unsuccessful.

The methods suggested for the detection of typhoid fever by laboratory methods are equally applicable to the paratyphoid fevers.

Amebic Dysentery

Although it has been claimed that many animal parasites cause diarrhea and dysentery, not all agree that this is true. It is plainly evident, however, that *Balantidium coli* and *Endamoeba histolytica* are causes of dysentery. The former parasite is rarely encountered but once observed is never to be forgotten. It is a large, oval ciliate, about 150 microns in length, and is readily seen, rapidly moving, with the low powers of the microscope. The stools passed by the patient are variable, but at times may contain blood and mucus.

Diagnosis of *Endamoeba histolytica*, on the other hand, gives the greatest difficulties, owing to the fact that at least four other amebas may be confused with it. The minuteness of its distinguishing characteristics, and the variability in the various species of intestinal amebas, require that one shall be properly trained and experienced before attempting identification of these forms.

In acute cases of amebic dysentery the typical stool will contain dark brown streaks of mucus and the whole stool, which is small in volume, will be of dark brick color or reddish brown, owing to the presence of partly decomposed blood. Sometimes flecks of bloody mucus are present, and in these flecks amebas are most numerous. Charcot-Leyden crystals are usually present but are not diagnostic. In amebic stools, as a rule, there is more blood than pus, and when

the reverse is true one should think of tuberculosis or of chronic ulcerative colitis.

In cases of amebic dysentery the amebas will be in the motile or vegetative stage, and the diagnosis will have to be made on the basis of trophozoites. Between attacks the stool may be normal, and unless a cathartic is administered the diagnosis will have to be made on the finding of cysts. A single stool from each patient, following his taking of an ounce (30 c.c.) of magnesium sulphate, will, in competent hands, disclose about 80 per cent of the infections, while one formed stool from each person will reveal only about 30 per cent of the infections. Three liquid stools may be expected to yield as large a number of positive results as six to ten formed stools. The stool should be examined as soon after its passage as possible, and if it is liquid it must be kept warm until examination. It is best to have the stool passed in the laboratory quarters. It may be necessary to examine many different portions of the stool and one should make coverglass preparations from portions which contain mucus, or blood, or both. The search should be conducted with low power ($\times 100$) lenses—identification, with greater magnification.

It will not be practicable here to discuss the various differential features of *Endamoeba histolytica*, and for these one must consult published monographs and texts which will not only give the morphologic details but methods of staining as well. One often has to resort to permanent fixed and stained slides before identification can be made. It is important to keep in mind the fact that the details of the nucleus are, after all, the real basis of identification, although in properly prepared fresh preparations the directional nature of the locomotion of the ameba, and the presence of ingested erythrocytes, are important features.

Sometimes one can save time by making the smear from the bloody mucus taken from an ulcer, with a wire curet, in the course of the proctoscopic examination. This material is placed on a slide, a coverglass is applied, and examination is made directly. From an amebic ulcer the organisms may be obtained in large numbers in this manner and such amebas can, without much danger of error, be called *Endamoeba histolytica*.

During the past decade many cultural methods

for diagnosing amebic dysentery have been advanced. There is no doubt but that one may succeed in growing *Endamoeba histolytica* on a variety of mediums. However, not all stools containing the parasite will yield positive cultures, and once the parasite is growing, the same problems of identification will arise, as well as some added confusing items. In cultures, the nuclear characteristics are modified, and until someone records these in a clear-cut manner there will remain some confusion on the subject. It is evident to anyone who has given consideration to the comparison of smears and of cultures that the skill and persistence of the microscopist will greatly determine how many more cultures than smears are found positive.

Craig's complement fixation test for amebiasis has not yet been simplified to such a degree that it can be used as a routine diagnostic method. The antigen is especially difficult to prepare and the spread between the antigenic titer and the anticomplementary titer is not great enough to avoid false positives when the test is made sensitive enough to be diagnostic.

It becomes evident that the diagnosis of amebiasis should be made only by those specially qualified, and that one should be prepared to use the method of direct smears of fresh material, the staining method on wet fixed slides, and also cultural methods.

Summary

It is clear that the laboratory investigation of dysenteric cases involves many different and highly specialized procedures as well as thorough knowledge of the course of different diseases in which dysentery is one of the symptoms. The laboratory man can be of great assistance in diagnosis and in following the course of the disease, as well as in the treatment of patients suffering from this symptom-complex. It is hoped that the foregoing discussion will serve as an outline for laboratory procedure and that it may stimulate physicians to investigate more carefully the etiologic agent involved in the cause of dysentery when that symptom is manifested by a patient.

ROENTGENOLOGIC MANIFESTATIONS OF DISEASES WHICH HAVE DYSENTERY AS A PROMINENT SYMPTOM*

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BEFORE considering the roentgenologic manifestations of the specific pathologic processes in which dysentery is a prominent symptom, I propose to remark briefly about the nature of the roentgenologic examination and what might be expected of it, especially as it is applied to the investigation of the gastro-intestinal tract. Its primary purpose is to prove the presence or absence of organic disease in those divisions of this system which cannot be visualized directly or by endoscopy. The positive contributions it makes to the diagnosis of functional gastro-intestinal disorders are of highly questionable, if not of entirely negligible, value and afford at best objective evidence of disturbances in gastro-intestinal motility which already is apparent subjectively. But in the diagnosis of organic disease

of the gastro-intestinal tract, the efficiency of the roentgenologic examination is proved. It can be made, and in the hands of competent examiners actually is made, to disclose organic disease whenever present. Moreover, it can be depended on to supply desired information about the pathologic nature, extent, severity, and important anatomic complications of the lesion which it has been instrumental in disclosing. In precision and reliability it approaches that of direct inspection at necropsy or exploratory operation.

To the experienced physician the term "dysentery" suggests at once a disorder or dysfunction of the large intestine or terminal portion of the small intestine, because in the vast majority of instances in which an organic lesion manifests itself by dysenteric symptoms, that lesion will be found in the colon or in that portion of the small intestine just proximal to it.

*From the section on Roentgenology, The Mayo Clinic, Rochester, Minnesota. Part of symposium read at the annual meeting of the Minnesota State Medical Association, Minneapolis, June 25, 1935.

The group of diseases of the large intestine in which chronic dysentery is the most prominent symptom is the chronic ulcerative colitis group. The term "chronic ulcerative colitis" is used here in a general rather than in a specific sense. Only three etiologic types are commonly encountered: the streptococcic type, the tuberculous type, and the amebic type. Others, in my experience at least, occur rarely, and are readily recognized as entities. It has not been found practical to consider them seriously before the three prevalent types, which have just been mentioned, have definitely been excluded in the diagnosis.

All types of organic colitis have similar gross pathologic appearances. General contraction of the affected portion of intestine—which implies narrowing, shortening and mural thickening and mucosal destruction are common to all types. With the exception of the changes in the mucosal surface of the intestine, none of these macroscopic features are in themselves pathognomonic, since the pathologic processes of which they are a part are essentially the same, whatever the etiology of the disease. The mucosal lesions are, however, more or less distinctive macroscopically; hence, direct inspection of the mucosal surface of the bowel, as for instance by endoscopy, usually, but not invariably, will reveal the etiologic nature of the pathologic process.

The fundamental principle that roentgenologic manifestations reflect the anatomic changes produced by, or associated with, the underlying pathologic changes holds eminently true in the roentgenologic diagnosis of this group of diseases; it is most important, however, to realize that the ulcerative aspect, which is the pathognomonic feature at direct inspection, is of minor significance in the roentgenologic diagnosis. Narrowing and shortening of the bowel are easily recognized roentgenologically; mural thickening and diminished mobility and flexibility are signs elicited by the reaction of the affected intestinal segment to the pressure of the roentgenoscopically controlled palpating hand, and destruction of the mucosa is revealed by significant changes in its relief. These constitute the roentgenologic syndrome of ulcerative colitis in general (Fig. 1). By themselves, however, they are not peculiar to any particular type of ulcerative colitis. The differential diagnosis is based on an entirely

different group of roentgenologically demonstrable features. Among the most important are the site of apparent earliest and most severe involvement, the distribution of the disease in the bowel, the direction of its extension, the intensity of the process, and the related roentgenologic findings in other organs.

Streptococcic ulcerative colitis is widely known as "chronic ulcerative colitis," a term which is considered inadequate because it is not sufficiently specific. It is the disease with which Bargen's bacteriologic researches have chiefly been concerned. In this type of ulcerative colitis the rectum is usually the site of early and most severe involvement, and since the proctoscopic examination provides a pathognomonic picture, the diagnosis should be made by this method, although when the involvement is sufficiently extensive the roentgenologic syndrome is but little less characteristic and specific. The principal function of the roentgenologic examination is the determination of the extent of the pathologic process, the presence or absence of the various complications of the disease, and, in those comparatively rare instances in which the disease has not primarily involved the rectum, it offers the only nonsurgical objective evidence of the pathologic process.

The general roentgenologic picture of the disease is fairly uniform. The affected portion of the bowel is narrowed and shortened, the walls are thickened, the contours are smooth and straight, and mucosal destruction of some degree is present. These changes are more intensified in the streptococcic type than they are in the other forms of ulcerative colitis. The most severe involvement is seen in the rectum and in the sigmoid flexure of the colon; progression is proximal, and the intensity of the changes diminishes gradually from below upward. This roentgenologic appearance is so regular and so characteristic in almost all instances of the disease that it practically never is justifiably confounded with that of any other known disease of the intestine.

The roentgenologic manifestations of the tuberculous and amebic types of ulcerative colitis differ from those of the streptococcic type principally in that the earliest and most severe involvement is found to be in the most proximal segments of the colon, and the changes in these

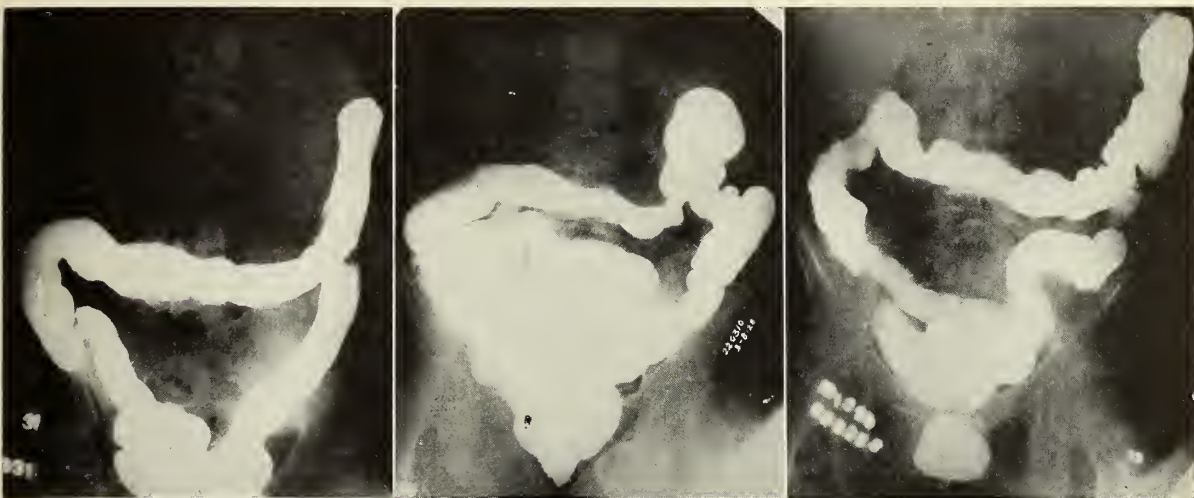


Fig. 1. The three most commonly encountered types of ulcerative colitis. Streptococcolic (left), tuberculous (center), endamebic (right). All have narrowing, shortening, suppression of haustral markings in common. The colon in all of these instances has been distended with the opaque enema.

types progress distally as well as proximally. This progression takes place by the development of multiple discrete ulcers which eventually coalesce. The fecal current assists in the spreading of the disease by carrying infectious material from ulcerated surfaces to other vulnerable regions of the intestine. Thus, the extension is unlike that of the streptococcolic type, in which the disease spreads against the fecal current in a creeping, step by step fashion, and results in a diffuse symmetrical involvement of the entire circumference of the bowel. In tuberculous and amebic ulcerative colitis the tendency is toward an irregular involvement of the circumference, and toward an interrupted rather than a continuous extension along the longitudinal axis of the intestine.

Ulcerative tuberculous enterocolitis is practically always secondary to some distant active focus of tuberculosis, usually in the lungs, and from foreknowledge of the existence of such a focus the diagnosis of an intestinal lesion might be inferred, no matter what intestinal abnormality is discovered or assumed to be present. This inference does not merit implicit reliance, however, since non-tuberculous intestinal lesions may and do coexist with extra-intestinal tuberculous foci, and tuberculous intestinal processes are not frequently encountered in cases in which no other tuberculous focus is demonstrable. Careful study of the anatomic changes as they are mirrored in the roentgenologic picture of the involved segment of intestine is a much more

intelligent approach to the diagnosis, and it is reasonable to assume that these anatomic changes will be apparent roentgenologically as early as they manifest themselves clinically by functional abnormalities and subjective symptoms. Typically tuberculous intestinal lesions are distributed most densely in the terminal portions of ileum, in the cecum, and in the proximal portion of the colon, and it is this characteristic distribution which constitutes the important roentgenologic evidence of intestinal tuberculosis.

Amebic ulcerative colitis, too, is a disease primarily of the proximal portion of the colon and of the cecum. Amebic lesions in the terminal portion of the ileum are but rarely found, even in the final stages of the disease. As is the case in the streptococcolic type of ulcerative colitis, the roentgenologic examination does not reveal the primary diagnosis. The presence of *Endamoeba histolytica* in the stools means, according to Craig and others, that intestinal ulceration of some degree has taken place. In most instances of endamebic parasitism seen in this latitude, extensive intestinal ulceration is by no means the rule, and in my experience hardly more than 50 per cent of known carriers of *Endamoeba histolytica* have intestinal lesions severe or extensive enough at the time of examination to be demonstrable roentgenologically. It is to be noted in this connection that the intensity of the anatomic changes and the intensity of the intestinal symptoms of amebiasis do not go hand in hand.

When roentgenologically demonstrable patho-

logic changes in the intestine do occur in cases of amebic parasitism, they are essentially the same as those produced in association with the other types of ulcerative colitis except that the process seems to be one of comparatively diminished intensity and severity. Amebic ulcerative colitis has a fairly distinctive roentgenologic "look," difficult to describe, but the most significant roentgenologic finding is that of an ulcerative colitis more or less diffusely spread over the cecum and the immediately adjacent ascending colon, without recognizable ileal involvement. If the process has a more general colonic distribution, the more dependent segments of the colon are sites of predilection, and these are responsible for the patchy, irregular deformity. Often relatively unaffected loops of colon are seen interposed between others which are definitely diseased.

To obviate as much confusion as possible the attempt is made here to consider only the typical and most commonly encountered manifestations of this group of diseases. It is true, of course, that atypical manifestations occur to confound even the most experienced observer, but such instances fortunately are rare; and it is somewhat consoling to the roentgenologist to note in such instances that other interested parties, not including the patient, of course, are frequently quite as much at sea.

Patients afflicted with the so-called infectious dysenteries, bacillary dysentery and typhoid fever, are rarely referred for roentgenologic examination, presumably because of the acute and fulminating character of the clinical manifestations. Chronic forms of bacillary dysentery are either of extremely low incidence, or their roentgenologic manifestations are as yet indistinguishable from those of ulcerative colitis, which have just been considered.

Occasional instances of chronic ulcerative enteritis and enterocolitis occur, in which involvement is confined to regions of the small and large intestine. Frequently they make themselves manifest clinically by dysenteric symptoms. Pathologically, the involved segment is affected in very much the same manner as is the colon in one of the types of ulcerative colitis. It is to be expected that the roentgenologic manifestations will also be similar, depending entirely as they do on the character, severity, and extent of the pathologic changes. Significant again is the

mural thickening and narrowing of the lumen, shortening, pronounced stiffening, and diminished mobility of the involved segment, with greater and lesser degrees of mucosal destruction (Fig. 2). All of these changes are readily revealed by the properly executed roentgenologic examination of the small intestine. Such examination demands closest scrutiny of each individual portion of the small intestine by multiple roentgenoscopic observations of the opaque meal as it winds its way through the complicated system of small intestinal coils. Combined with this is the special roentgenologic examination of the terminal 25 to 100 or more centimeters of ileum after it has been distended by reflux of the opaque enema through the ileocecal orifice (Fig. 3). This procedure is to be looked on as an integral part of the basic examination of the colon with the opaque enema, in much the same manner as the examination of the duodenum is an integral part of the examination of the stomach. The roentgenologic examination of the small intestine is difficult only because it is comparatively tedious, but it can be made quite as efficient as the roentgenologic examination of the more proximal and more distal divisions of the alimentary tract.

Pathologically allied to all of these organic intestinal disorders, but only rarely causing dysentery, are the specific and nonspecific granulomas. Granulomas are called specific if a primary etiologic factor, such as the *Bacillus* of tuberculosis, *Endamoeba histolytica*, or *Actinomyces* can be shown to be operative in producing the lesion; they are called nonspecific, if no such factor is recognized. Since they are almost identical in their gross morphology, they have very similar roentgenologic features. They are essentially inflammatory tumors, and, as such, the important diagnostic problem is to recognize them as non-neoplastic in character. This is efficiently accomplished at the roentgenologic examination, principally because neoplastic lesions of the intestinal tract manifest themselves by such distinctive and pathognomonic roentgenologic signs that the diagnosis of "granuloma" is put forth when these signs fail to be exhibited. Roentgenologically, however, it is rarely possible to qualify the diagnosis of granuloma by giving it an etiologic name. Guesses at the etiology of these lesions are sometimes hazarded, but the roentgenologist usually offers the diagnosis of

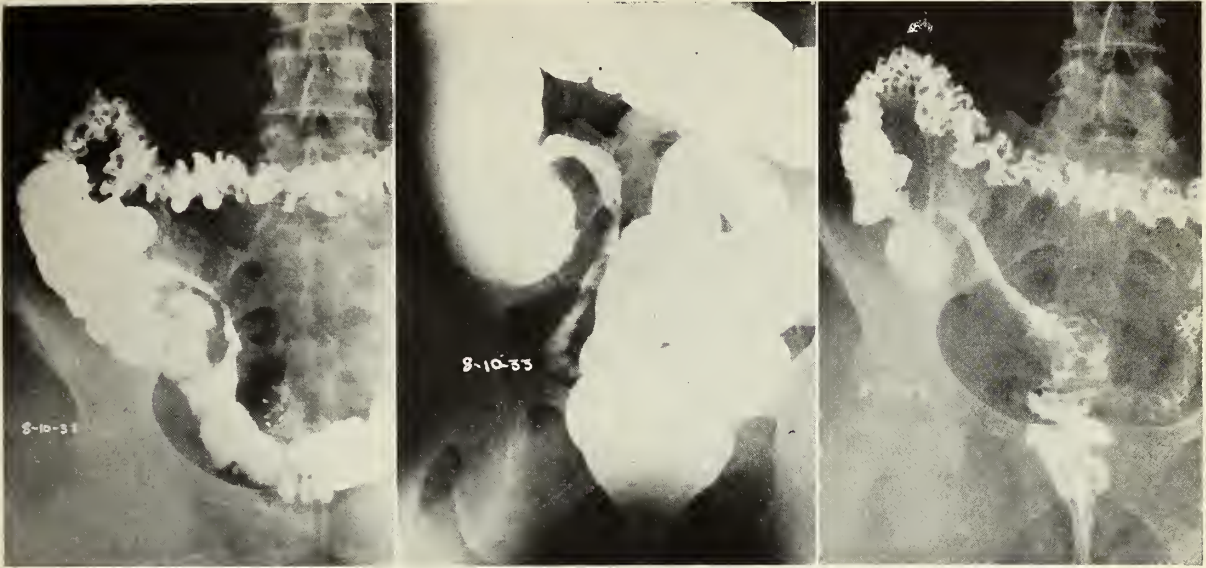


Fig. 2. Diffuse ileitis in which only the terminal segments of the ileum are involved. The opaque meal (left) six hours after ingestion, showing the narrowing of the involved ileum. The colon and terminal ileum of the same patient are shown distended with the opaque enema (center) and after evacuation of the opaque enema (right). The roentgenologic findings of this disease described in the text are best elicited by this method.

granuloma without further qualification, and is content if he is satisfied that the lesion is not malignant.

Of the neoplastic lesions which have dysentery as a prominent symptom, only the conditions known as polyposis and polypoidosis need be taken into consideration. By the term "polyposis" is meant that condition in which the mucosal surface of the bowel or a relatively large portion of it is regularly or irregularly studded with numerous, sometimes innumerable, small sessile or pedunculated, discrete polypoid or bud-like adenomatous tumors. Polyposis is called primary when there has been no antecedent ulcerative condition predisposing to or provoking adenomatous hyperplasia. The tumors are therefore true neoplasms. Conversely, when such an ulcerative process has existed, the condition is designated as secondary, and the lesions are looked on as regenerative or reparative phenomena. Both have a decided tendency toward malignant transformation. By the term "polypoidosis" is meant that condition in which the entire mucosal lining of the bowel, or a large part of it, seems to have been transformed into a convoluted, luxuriant mass of adenomatous tissue. It is always primary, and according to Broders is essentially a benign process, except that discrete sessile or pedunculated adenomas, which are almost always found distributed densely or sparsely in the transformed mucosal



Fig. 3. The colon and ileum after evacuation of the opaque enema. The ileum has been filled with the opaque suspension by reflux through the ileocecal valve.

surface, may be or may become carcinomas. Hence, for practical purposes, the distinction between the two words is relatively unimportant from a clinical standpoint.

Roentgenologically, these conditions of the large intestine are of extreme interest because they produce no readily recognizable deformity of the shadow of the lumen of the bowel, and it

was not until Fischer described his so-called "double contrast technic" that the roentgenologic diagnosis was made with any great degree of confidence. True, if the individual polypoid lesions

projections into the colonic lumen, or as circular rarefied defects on the mucosal surface corresponding to the site where the pedicle of the polyp is attached. In the primary type of poly-



Fig. 4. Solitary secondary polypoid lesion in transverse colon (left). The patient has chronic ulcerative colitis. Double contrast roentgenogram showing diffuse primary polyposis (center). The small round rarefied areas are the sites of the small polypoid lesions, the morphology of which may be noted from the necropsy specimen (right).

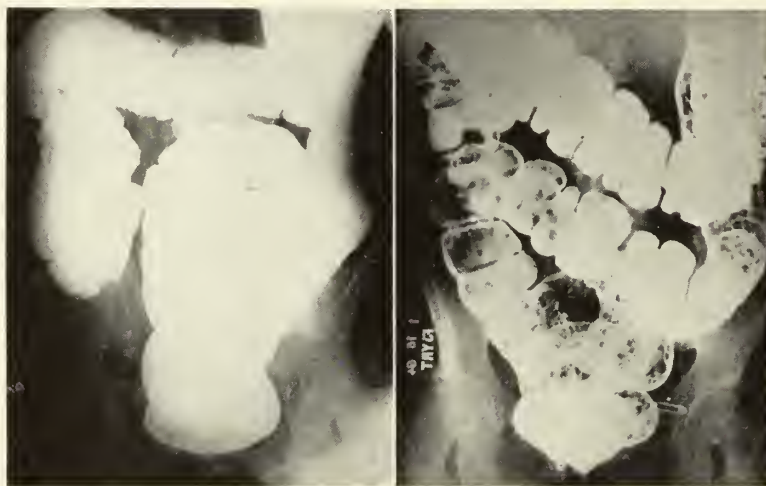


Fig. 5. Diffuse polypoidosis. Opaque enema (left) which fails to reveal the lesions. Double contrast method (right) which shows the pathognomonic picture of the disease.

were large, they produced the smooth ovoid or rounded central filling defects in the barium column, but the lesions are not often of sufficient size to do this. With the double contrast method, however, a very vivid and pathognomonic representation of all types of polyposis, polypoidosis, and single polypoid lesions is obtained, and it is possible to visualize even the smallest mucosal excrescences (Fig. 4). The small polypoid lesions of polyposis are seen as bud-like

posis, evidence of antecedent disease is lacking and the mucosa between the discrete, fairly regularly distributed polypoid lesions is intact. In the secondary type, the pathologic changes produced by the primary disease are manifest, and the tag-like sessile and pedunculated masses are clearly visualized and are irregularly strewn over the internal glazed surface of the bowel. The "double contrast" roentgenogram of polypoidosis is especially vivid. The opaque material settles

into the crevices of the villous adenomatous tissue, and when the lumen is redistended with air or inert gas, a pathognomonic lacy internal relief pattern is developed. This produces, without doubt, one of the most striking pictures the field of roentgenology has to offer (Fig. 5).

It may be stated as a principle that it is rarely, if ever, possible to elicit roentgenologic signs by which one can affirm that a given neoplastic lesion is benign. In the gastro-intestinal tract there are no positive roentgenologic signs of malignancy. Hence, in connection with these polypoid lesions it is important to bear in mind that the roentgenologic examination may reveal that a given lesion lacks the macroscopic characteristics pathognomonic of malignancy. Microscopic examination may reveal, however, that any one of these grossly benign lesions is actually malignant.

Very severe diarrhea without intestinal bleeding is a prominent symptom of a group of diseases which for convenience are designated as deficiency diseases, and of which chronic idiopathic steatorrhea, tropical and nontropical sprue, and pellagra are the most frequently encountered examples. Striking roentgenologic findings have been described; these correspond to anatomic dilatation, edema, atrophy, and congestion of various portions of the small and large intestine, especially of the former. The contours of involved segments are either abnormally smooth or abnormally shaggy, and the normally prominent pattern of the mucosal relief is mark-

edly exaggerated or markedly suppressed. The opaque material is sometimes gathered in pools in isolated dilated segments. The motility is usually considerably subdued. The picture is rather typical and common to all of the conditions under consideration, but it is difficult to describe. Rather striking is the return of the intestine to normal with regression of symptoms.

It is true that in one phase or another of its clinical course almost any organic disease of the intestinal tract may be associated with dysenteric symptoms. Here, however, only those organic diseases in which dysentery is a more striking feature, have been given attention. Dysentery is not a prominent symptom of carcinoma, but the possibility that malignancy, especially of the lower colonic segment, may be manifested by dysenteric symptoms must be kept in mind. Of course, any significant change in intestinal habit, be it constipation or diarrhea, which does not tend to disappear within reasonable limits of time, may be the signal of serious organic disorder, and the roentgenologic examination, reaching as it does to a solid foundation in normal and pathologic anatomy for its diagnostic data, has become such an important part of the complete health audit, that the title of "autopsia in vivo," can well be applied to it.

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DYSENTERY: ITS MEDICAL MANAGEMENT*

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FROM the standpoint of the average practitioner of medicine, it is safe to say that intestinal disorders associated with dysentery are the cause of more distressing problems than disease of almost any other part of the body.

In general, dysentery may be divided into that

attributable to organic causes and that attributable to functional disorders. Organic intestinal disorders readily divide themselves into neoplastic and non-neoplastic diseases. The latter class might better be designated as diseases of inflammatory origin and those of which the origin is some deficiency. Functional intestinal disorders readily divide themselves into local, systemic, and metabolic (Table I).

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The most important differential diagnostic method of studying cases of dysentery is by careful and detailed taking of histories. However, to rely on the history alone will result in many regrettable errors of omission. Many physicians will recall cases of irritable colon in which, for months, treatment was for colitis, or they may recall what was more serious, cases of carcinoma, in which the mistaken diagnosis of colitis was adhered to until chance of cure had faded. Therefore, while taking of the history is the indispensable and most important guide to the diagnosis, there is no other series of similar symptom-provoking conditions that lends itself so well to further routine study as the dysenteries. A well-ordered set of objective investigations will lead to the correct diagnosis in nearly all cases of dysentery.

Symptoms

The nature, type, and severity of diarrhea is of utmost differential diagnostic importance. Whether a patient has twenty loose, watery stools, or three or four mucopurulent rectal discharges in each period of twenty-four hours is diagnostic. The amount of tenesmus, straining at stool, incontinence, abdominal cramps, borborygmi, and abdominal distention are all very important. The presence or absence of mucus in the stool has no diagnostic significance. Mucus is the normal colonic secretion. On the other hand, the presence or absence of blood in the stools is the most important sign, distinguishing organic from functional disease. Yet, the absence of blood does not rule out organic disease. It is well to consider that all rectal bleeding is attributable to carcinoma until proof to the contrary is available. The quantity of pus in the stools or rectal discharges has great significance. Emaciation, rapid loss of weight, and anemia have great diagnostic value.

General Physical Examination

General inspection of the patient is important. The facies are often suggestive of the type of disease. Pallor and anxiety occur with severe organic disease or, on the other hand, full robust features may be noted in cases of functional disorder. Examination of the chest may elicit the findings of tuberculosis. The scaphoid abdomen may suggest tuberculosis or chronic ulcerative colitis. The cordlike feeling imparted by the colon may be suggestive, if on the left side, of

TABLE I. CONDITIONS ASSOCIATED WITH
DYSENTERIC SYMPTOMS

- I. *Functional* intestinal disorders
 1. Local
 - a. Irritable or unstable colon: "Mucous colitis"
 - b. Gastrogenic diarrhea
 - c. Foreign bodies
 2. Systemic
 - a. Nervous diarrhea
 - b. Allergic diarrhea
 - c. Food poisoning
 - d. Trichinosis
 3. Metabolic
 - a. Hyperthyroidism, uremia, and so forth
- II. *Organic* intestinal disorders
 1. Neoplastic
 - a. Polyposis and polypoidosis
 - b. Carcinoma
 - c. Sarcoma: Lymphosarcoma
 2. Non-neoplastic
 - a. The *ulcerative colitis* group
 1. Streptococcic
 2. Tuberculous
 3. Amebic
 4. Unknown etiology (?)
 - b. The *infectious dysentery* group
 1. Bacillary dysentery
 2. Typhoid fever
 - c. Granulomatous processes
 1. Specific: Tuberculomas, amebic granulomas, and so forth
 2. Nonspecific
 - d. Regional enteritis, colitis, and enterocolitis
 - e. Deficiency diseases
 1. Pellagra
 2. Sprue

chronic ulcerative colitis, if on the right, of other inflammatory disease. Finally, the most important part of the physical examination is careful, digital exploration of the rectum. The wall of the rectum in all functional disorders is soft and pliable and the mucosa is smooth and velvety. The wall of the rectum in amebiasis and tuberculosis may also be soft and pliable but if lesions have advanced to involve the rectum, irregular depressions will be found in the mucosa. The wall of the rectum in chronic ulcerative colitis will be stiff, thickened, the lumen narrowed, and the mucosa will appear roughly granular. Polyps in the rectum are readily palpable and carcinoma imparts a characteristic feeling to the finger.

Stools and Rectal Discharge

Doctor Magath has thoroughly covered this part of the subject, but let me speak, again, of the immense value of gross inspection of the

stools. During some stages of chronic ulcerative colitis, the characteristic sanguinopurulent rectal discharges alone allow the diagnosis to be made.

Proctoscopic Examination

Many organic lesions of the colon can be positively diagnosed by visualization through the proctoscope or sigmoidoscope. Thus, the uncomplicated pictures of chronic ulcerative colitis, tuberculosis, and amebiasis are characteristic. Proctoscopic examination of the rectums of patients who have polyps or carcinoma offers the added advantage of allowing removal of specimens. Frequently the diagnosis of diverticulitis can be made through the proctoscope by visualization of the upper rectal sacculation and spasm. Proctoscopic examination is of great importance in functional colonic disorders, because it discloses the fact that the lining of the bowel is normal.

Roentgenologic Examination

This should always be the final one of the series of investigations of the bowel. Doctor Weber has discussed this in detail and I wish only to emphasize the place of this examination, that is, as the last step of a complete and thorough intestinal study.

Order of Examinations

To recapitulate, the order of examination of a patient who has dysentery, providing the patient's condition warrants, should be as follows: thorough physical examination, digital examination of the rectum, examination of stools, proctoscopic examination and roentgenologic examinations.

Other procedures may be advisable, such as analysis of gastric content, investigations of allergy, and food elimination tests, but these will be found advisable in a relatively small number of cases and usually need be made only when the other tests have not yielded sufficient diagnostic data.

Careful studies of the blood can be made while the other tests are being carried out and should be done routinely.

Treatment

A detailed discussion of the management of any one of the conditions listed in Table I cannot be given here. Furthermore, the duty of the clinician is largely concerned only with the

diagnosis of many of these conditions. However, there is no group of human ailments which demand closer coöperation of the surgeon, clinician, roentgenologist, and the laboratory physician than the many disorders of the intestine. Hence, there is no real division of responsibility in the care of these patients, but rather, the whole group is best handled by the combined and coöperative efforts of all concerned. My remarks concerning the therapeutic efforts made for this group of patients will be limited largely to three diseases: amebiasis, chronic ulcerative colitis, and functional intestinal disorders.

Amebiasis.—Chemotherapy plays a very important rôle in the treatment of amebic dysentery. The purpose of therapy in these cases is three-fold: to eradicate the parasites in the intestinal lumen, to eradicate the parasites in the walls of the intestine and other distant foci, and to promote healing of the lesions they have produced.

The following combinations of drugs have been found to produce these results in a very satisfactory manner. For the average case, emetine hydrochloride grain $\frac{2}{3}$ (0.043 gm.) twice a day is administered hypodermically until 4 grains (0.24 gm.) have been given. For the more acute cases 1 grain (0.065 gm.) twice a day up to 6 grains (0.4 gm.) may be advisable. At the same time, tablets of treparsol, each 0.25 gm. are administered. One tablet is chewed before each of twelve successive meals (three times a day), the course taking four days. A rest of a week follows, and the same course of treatment is repeated. Two courses of emetine are usually sufficient, nor is it often safe to give more. Three courses of treparsol are usually required. Between the second and third courses of treparsol, and after the third, one of the compounds of iodine such as vioform may be given. Tablets of this are of the same size as those of treparsol.

Diet should be generous but bland and will be graded, more bland or less bland, according to the severity of the disease.

After completion of the course of treatment, stools should be examined by a competent parasitologist, and such examination should be repeated several months later.

Chronic ulcerative colitis.—This is one of the most serious diseases to attack the digestive tract

of man. At present, there are fairly well standardized methods of management of this disease. Much, however, remains to be done for control of this disease and its many complications. Uncomplicated cases of chronic ulcerative colitis are medical problems. Some complications of the disease are surgical, and certain operations may become essential adjuncts to well managed medical cases. The surgical indications will be discussed by Doctor Dixon.

No single therapeutic agent will suffice in the care of these patients. Present management in use at The Mayo Clinic divides itself into the following departments: (1) rest and restful recreation, (2) a careful dietary program, (3) administration of serums and vaccine, (4) removal of foci of infection, (5) transfusions of blood, (6) supportive measures, (7) careful nursing, (8) physiotherapy, hydrotherapy, and occupational therapy, (9) administration of drugs, and (10) local treatments.

Chronic ulcerative colitis should be looked on much as is tuberculosis, and so a well-ordered, graduated program of rest, at first rest in bed, then graded activity, and finally mild physical recreation, are in order.

Many patients who have had this disease have, in the course of time, omitted one food and then another from their diet so that ultimately their diet has become very limited. It is well then to return them by easy stages to a generous, high calorie, high protein type of diet, beginning with easily assimilated, palatable, non-irritating foods and increasing the diet day by day as rapidly as the patient's condition will tolerate. Not infrequently, parenteral feedings in the form of intravenously administered solutions of glucose or subcutaneously administered physiologic solution of sodium chloride, to restore an adequate fluid balance, are indicated.

The serum prepared by immunizing horses against the diplostreptococcus of colitis may be administered intramuscularly, or, in some severe cases, intravenously. Results with the use of this serum are most gratifying. The anti-colon bacillus serum recently prepared by Schwartzman bids fair to have value. The reactions from anti-dysentery bacillus serum are frequently so severe that their use is indicated only in the most resistant cases. Their value, as anything more than a nonspecific foreign substance, is problematical. Vaccines prepared from the diplo-

streptococcus isolated from the rectal ulcers should be administered subcutaneously in the less severe cases, or when active and severe symptoms have subsided.

Distant foci of infection, particularly about the mouth, such as tonsils and abscessed teeth, should be removed.

Blood transfusions have value in two phases of the disease; when the individual is greatly depleted or when the individual has had a long siege of fever and sepsis, and is anemic. A series of small transfusions, say, about 250 c.c. of blood each, given every four or five days, for four or five weeks, have much greater value than one or two transfusions of larger amounts.

Osler has well said that disease above the diaphragm makes for optimism and that below the diaphragm for pessimism. Hence, in this disease, any measures which will make for physical stimulation and distraction are in order. For this reason, mild forms of occupational therapy have great value.

Many drugs have been advocated in the treatment of chronic ulcerative colitis. No single one has helped more than a few individuals. Sedatives, and particularly codeine and other forms of opium, are decidedly indicated in the more severe cases. Tincture of iodine, given by mouth, has value in selected cases. Arsenic, in the form of stovarsol, treparsol, or carbarsone, is dangerous when used for treatment of chronic ulcerative colitis. It has been used somewhat promiscuously recently, particularly since the recent outbreak of amebiasis. It frequently has seemed to be the basis of severe flare-ups. Its only indication is as a tonic in very small amounts after the patient has ceased passing blood. A warning should also be expressed about the use of mercury, in such forms as mercurochrome.

Local treatments are indicated only when there is much anal discomfort, as from fissures and fistulas, or when the lesions are confined to the most distal segments of the large intestine. Chronic ulcerative colitis is a disease not of the mucosa but of the intestinal wall, and hence colonic irrigations not only fall entirely short of the purpose for which they are intended but often cause irreparable irritation.

From these remarks, it becomes obvious that a well ordered program of activities is necessary for adequate treatment of patients with chronic ulcerative colitis.

Irritable colon, unstable colon, "mucous colitis."

—The most common intestinal dysfunction to come under the care of the practitioner of medicine falls in this category. Yet the diagnosis never should be made until every possible chance of organic disease has been excluded. Therefore, the most important therapeutic measure in these cases is careful taking of histories and extremely careful and detailed objective investigations. One must be able to assure the patients, without a shadow of doubt, that they do not have serious colitis or carcinoma. Most of the problems are individual and really should not be classed under the heading of dysentery; yet so often are they confused with real intestinal disease that these few comments may not be amiss. Among the measures particularly required for individuals afflicted with such unstable colons are careful study of their mental reactions, ample rest and diversion, freedom from nervous tension, careful regulation of diet, and advice about mild and soothing sedatives. The question of allergy must be carefully investigated. If achlorhydria is present, dilute hydrochloric acid should be tried. Finally, the question of deficiency disease, whether the deficiency is in the nature of food or of necessary metabolites, must be gone into thoroughly.

The management of any case of acute dysentery of undetermined origin is about as follows: In general, the patient should be treated as if he had one of the transmissible forms of dysentery, such as typhoid fever or bacillary dysentery. Diagnostic criteria have been discussed by Doctor Magath, but while the tests to establish the diagnosis are being carried on, some of the

precautions that accompany isolation should be applied. Everything leaving the patient should be sterilized; feces and urine should be disposed of properly and containers for all excrement sterilized.

When the diagnosis has been established it may be found that such precautionary measures may be relinquished, or, as in bacillary dysentery, they may have to be even more stringent. In the case of bacillary dysentery, the usual supportive measures described for the severe case of chronic ulcerative colitis are in order. Specific treatment in the forms of administration of serum or bacteriophage and, later, vaccines, should be employed in these cases.

A word about the treatment of the tender anus and prolapsed and swollen hemorrhoids occurring with severe dysentery may be in order. Treatment should be palliative. Operation on such hemorrhoids should be avoided. Local heat, digital replacement, soothing ointments, and local sedatives should be employed for these local anal conditions. Irreparable damage has been known to occur with too drastic attempts to care for such anal conditions when much more serious disease was present above.

In summarizing, it can be said that many serious forms of dysentery and diarrhea afflict the human organism. Many of these are attributable to disease within the intestine, many more are the result of influences extraneous to the intestine. Their management presents many serious and usually individual problems. The unstinted coöperation of the physician in the laboratory, the roentgenologist, the surgeon, and the clinician is required.

SURGICAL TREATMENT OF THE DYSENTERIES*

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IT has been emphasized by those who have spoken before me that treatment of many of the dysenteries is distinctly a medical problem. It is common knowledge, however, that in many instances the passage of blood by bowel is a

signal denoting the presence of a condition which necessitates surgical intervention. Such lesions may be inflammatory, malignant, or potentially malignant. Although included in the inflammatory group are tuberculosis and nonspecific granulomas, I shall confined my remarks to those complications which arise in certain cases of chronic ulcerative colitis and which require

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Prepared as part of symposium but not read at the annual meeting of the Minnesota State Medical Association, Minneapolis, June 25, 1935.

surgical intervention. In discussing the surgical treatment of malignant and potentially malignant lesions which give rise to the passage of blood by bowel, I shall attempt to direct attention to the polypoid tumors of the colon because their presence is so frequently suggested by dysentery.

Essential Operations in Chronic Ulcerative Colitis

It seems worth while to emphasize two points regarding operations for this condition. First, that the need for surgical intervention has been strikingly diminished in our practice since we have employed the treatment which Bargen has mentioned; and second, that operations in such cases entail considerable risk. A decade ago, when the medical treatment of chronic ulcerative colitis was more or less empirical, establishment of an ileac stoma was frequently resorted to. The high risk of this procedure was emphasized by the late Sistrunk. He stressed the dangers of fatal peritonitis following ileostomy in these cases even if the procedure was carried out in a most meticulous manner. When one calls to mind the extensiveness of the ulcerations of the colon in chronic ulcerative colitis, the hazards of peritonitis can be seen.

The necessity for ileostomy in these cases has become increasingly less during the last few years. Of fifty-seven patients treated in 1923, sixteen required ileostomy; in 1932 only one ileostomy was performed. The cases of chronic ulcerative colitis which now require operation are those which are not amenable to medical treatment. A comparatively small group are those in which complications arise, such as strictures and perforations, polyposis and malignancy. It is my opinion that when permanent ileostomy is necessary, the single-barrel type, inverting the proximal end of the distal portion of the ileum, is best. Particularly is this true if the necessity for subsequent colectomy is anticipated. Strictures of benign character may involve only a small length of colon and may occur when the disease is arrested. In such instances, segmental resection can be performed with subsequent reestablishment of the continuity of the bowel.

Perforations frequently require establishment of an ileac stoma and later treatment as indicated. Frequently, enterostomy is all that is necessary. I recently saw a young man, aged thirty-two years, who was suffering from ulcerative

colitis. An acute perforation occurred in the hepatic flexure of the colon. Ileostomy was performed and, under medical management, no further operation was necessary. Within a year the entire process in the colon apparently had become arrested and the ileac stoma was closed. The patient made an uneventful recovery, and now, ten months later, he apparently is in good health.

Development of polypi in the colon following ulcerative colitis has been emphasized in a recent publication by Bargen and me. Such polypi apparently result from hypertrophied areas of mucous membrane between the sites of the previously ulcerated areas. Superimposed on these hypertrophic areas, true adenomas may form, with subsequent malignant degeneration. Another site for the development of malignancy in these cases is at the edge of one of the previously ulcerated areas, as Broders has stressed. The majority of malignant growths in the bowel of those who have suffered from ulcerative colitis are of extremely high grade. The incidence of malignancy, as Bargen has pointed out, is 2.5 per cent.

Colectomy occasionally is indicated in ulcerative colitis in those cases in which the condition is intractable. It is also indicated in those in which diffuse polyposis, with or without malignancy, develops. Carcinoma of the colon, superimposed or associated with chronic ulcerative colitis, may be rather diffuse throughout a long length of bowel or it may be local. Obviously the extent of the lesion determines the type of operation to be employed. When total colectomy is indicated, it is my opinion that it should be carried out in three stages: First, by the establishment of an ileac stoma; second, by removal of the colon down to the sigmoid or rectosigmoid, and third, by removal of the remaining portion of bowel. While this procedure is a formidable one, it fortunately is not often necessary.

Malignant and Potentially Malignant Lesions

I now wish to deal with the surgical management of that type of lesion which frequently gives rise to dysentery and which is so often not diagnosed until the symptoms have persisted for some time. I refer to the polypoid type of lesion of the colon. Until the recent improvement in roentgenographic technic, the presence of many

of these lesions could not be determined. There has been considerable discrepancy regarding the origin and nature of polyps and whether or not they were prone to become malignant. Menetrier, in 1888, classified polypoid lesions of the gastro-intestinal tract into two groups: First, discrete polyps, with either pedunculated or sessile independent attachments, which, he stated, consist largely of glandular tissue; and, second, polyps that arise from a common plaque-like base, which are closely packed in orderly rows and resemble the convolutions of the brain. These last apparently are due largely to the hypertrophied layers of the mucous membrane.

The majority of polyps of the colon with which we have to deal are those of the first group, or the adenomatous polyps. The fact that such polyps may become malignant has been accepted lightly by some. Both Robertson and Ewing have stated that in their opinion probably 50 per cent of the carcinomatous lesions of the colon develop from polypi. I shall cite two cases which emphasize this point:

Case 1.—A young man, aged thirty-four years, came to The Mayo Clinic in March, 1932. The important factor in his history was that he had had intermittent bleeding from the rectum for a period of ten years. The blood was never bright red; usually it was clotted and dark. Hemorrhoidectomy had been performed without relief, a procedure which is frequently employed in this type of case. Examination revealed a polyp in the first portion of the sigmoid. The patient refused operation, but an exaggeration of his symptoms caused him to reconsider and, one year later, exploration was carried out. A pedunculated polyp, about 5 cm. in diameter, was found in the first portion of the sigmoid. In the mesentery adjacent to the polyp, an enlarged lymph node the size of a lima bean (about 1 by 1.5 cm.) was removed for diagnosis. No other enlarged lymph nodes were found. The one removed showed adenocarcinoma. Segmental resection was carried out, from which the patient made an uneventful recovery. Two years have elapsed since then and his health remains good. Microscopic study of the polyp disclosed definite carcinomatous change (Fig. 1).

Case 2.—A woman, aged fifty-four years, was admitted to the clinic in January, 1935, because of dysentery of twelve years' duration. During the two years prior to admission her symptoms had become markedly accentuated, and she had passed blood by rectum more frequently and in larger amounts than formerly. Roentgenographic study revealed a single polyp in the midportion of the sigmoid, and at operation, in February, 1935, this polyp in the midportion of the sigmoid was found to have undergone malignant degeneration and to have invaded all layers of the bowel. Segmental resection was performed, and the patient's convalescence



Fig. 1 (above). Case 1. Section of pedunculated polyp from first portion of sigmoid, showing adenocarcinoma.

Fig. 2 (below). Case 2. Sessile polyp of the sigmoid, showing carcinomatous degeneration.

was uneventful. On examination the polyp was found to be definitely malignant (Fig. 2).

I cite these two cases to emphasize two points: First, that these lesions frequently are the cause of dysentery and may easily be overlooked, and second, that they do become malignant. It is true that many polypi of the bowel are benign, at least in the beginning. It seems fair to postulate in these two cases that malignancy was not present during the entire period of dysentery. Malignant degeneration of a polyp usually begins at its periphery, according to Robertson, and may gradually involve the stalk and later the various layers of the bowel. For those malignant polyps which are pedunculated, removal at the base of the pedicle would probably be sufficient to effect a cure, providing the malignant process had not gone beyond the site of amputation.

Diffuse polyposis of the colon is a condition which is not as common as was formerly supposed. In those cases which we have had an opportunity to study, malignancy almost invariably developed. In many instances, diffuse polyposis is hereditary. Colectomy has been carried out in such cases when four or five distinct carcinomas were present. Whether or not malig-

nancy is present in diffuse polyposis, the condition usually gives rise to such a marked dysentery that surgical intervention is necessary. A case in point is the following:

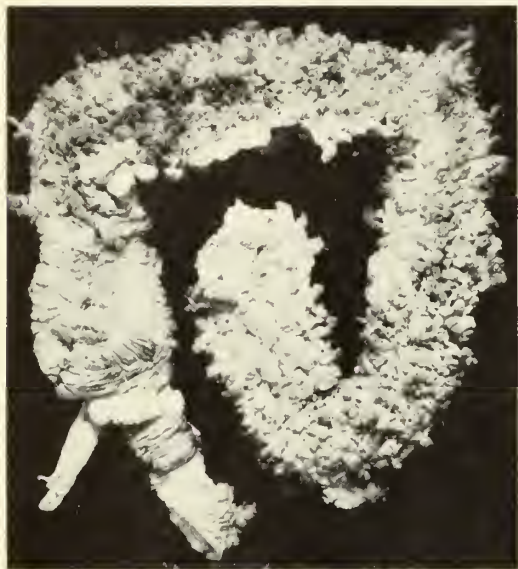


Fig. 3. Case 3. Section of colon showing diffuse polyposis.

Case 3.—A woman, aged twenty-four years, came to the clinic in January, 1934, because of profuse hemorrhages from the rectum. Examination

revealed diffuse polyposis of the colon (Fig. 3). The lesions were not pronounced in the rectosigmoid or in the rectum. Colectomy was performed, preserving the lower portion of the sigmoid and rectum. The first stage of the procedure consisted of ileosigmoidostomy; the second stage consisted of removal of the entire colon up to the site of the previous anastomosis. The lower part of the bowel was preserved because many of the polypi removed at the time of proctoscopic examination proved on microscopic study to be benign adenomas. It was felt that the remaining polypi in the rectum and rectosigmoid could be dealt with by fulguration.

Preservation of the lower portion of the sigmoid and rectum in this case probably was unwise. It did obviate a permanent artificial anus, to which the patient objected.

Summary and Comment

In this paper I have not attempted to discuss all the instances in which surgical treatment of lesions causing dysentery are indicated. The operations which are essential in chronic ulcerative colitis have been greatly decreased. Those which we find necessary have been referred to.

Polypoid lesions of the colon, so often the cause of bleeding, are briefly discussed, and the tendency of such lesions to become malignant is emphasized.

REMINISCENCES OF A RANGE PHYSICIAN

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Eveleth, Minnesota

BEFORE I began the study of medicine, I was connected with a drug store in a small town in Iowa. I often talked with the village doctor, an honorable and ethical practitioner, noted as an obstetrician. Those of his patients needing surgery were referred to a surgeon in a nearby city. I recall, about 1883, his showing me a dram vial containing one grain of cocaine in solution, for which he paid \$1.00.

About 1882 or 1883, I remember one patient, the village blacksmith, with greatly enlarged glands of the neck. Some of the glands, when removed, were found to be the size of a small hen's egg and filled a one-quart fruit jar. The surgeon who operated took no aseptic or anti-septic precautions. He operated with bare hands,

without special attempt at cleanliness. He did not suture the wound but packed cloth soaked in olive oil into it for a dressing and continued this treatment daily for weeks.

Another patient, a farmer's boy, with necrosis of the femur, was operated on at his home. The country doctor gave the anesthetic—ether. He took me with him to pour the ether into the mask, which was made by rolling a newspaper in the shape of a cone and stuffing a towel into it on which to pour the ether. Infection was beginning to attract attention and was thought to come from the air. The surgeon, who operated on the boy, attempted to carry out the then latest protective method by having a spray of 5 per cent carbolic acid in water from a small

cheap steam atomizer passing over the leg and surroundings during the operation, until it went out of commission. After he had exposed the bone, he asked the other doctors, including the anesthetist, to feel of it. He then asked me to feel of it. I, as I had seen the others do, put my fingers in the wound without washing my hands.

In 1885, a few days before college opened, I arrived in Chicago to begin the study of medicine. I had the privilege of seeing one of the leading surgeons of Chicago, and Professor of Surgery of the Chicago Medical College, operate at Mercy Hospital. The doctor wore a heavy beard. The operating table was a plain wooden affair. The seats of the amphitheater were also of wood. The surgeon came in, removed his coat, put on an old Prince Albert coat, which was kept hanging on a hook nearby for that purpose, took the instruments out of the bag, and went to work without any further preparation. He examined the patient's mouth with bare fingers, pulled an upper central incisor tooth, made the usual incisions and removed the left upper maxilla skillfully and without hesitation. This is a fairly accurate description of other operations witnessed during the year. These old-time surgeons were skillful and rapid.

Before I graduated, there was some attempt at antiseptic technic. Dr. Ralph Isham, another professor of surgery, gave us a rather dry lecture on the germ theory, as then understood, and told us about experiments being carried out on mice.

Some of the older men who had practiced medicine forty or fifty years and had seen and experienced many innovations, suggestions, and recommendations advanced at various times, a few of them good but most of no value, were rather skeptical about the germs being responsible for infection. The younger men connected with the college were favorably impressed with the theory.

During my senior year, I was second or student assistant to the chief surgeon of the Chicago and Northwestern Railroad, Dr. Owens, where the latest methods of caring for injured railway employees were carried out. Open wounds were irrigated with a solution of 5 per cent carbolic acid or 1-1000 bichloride of mercury, then dusted with powdered iodoform and

wrapped with unsterilized gauze or cotton. The wounds were dressed frequently, often daily.

After serving as assistant to Dr. Shipman, a mine physician, at Ely, for five years, I resigned, took a ten-weeks' postgraduate course in New York, and then located at Eveleth in June, 1894, as physician for the mine and railroad employees. The town had been started the year before, but hard times had come on and it was partially deserted. When I arrived there was a saloon, a boarding house, three or four families and a few shacks and tents, where some of the miners lived.

With borrowed money, I bought a few drugs and dressings, a second hand bed spring, a cheap mattress, moved into an unfinished and abandoned saloon shack and took my meals in a large tent with the other mining employees. This dining tent was located near a small creek one could jump across. A hole had been dug near it by the proprietor of the tent, who was also the cook, to furnish water for washing clothes, dishes, et cetera. The summer was hot and dry. The inside top of the tent was black with flies. Countless fly specks on the plates we wiped off as best we could with bread, before placing food on them. Typhoid fever resulted. The sick were cared for in tents, shacks, or wherever they lived. I was doctor and nurse, bathing the men, shaking out the dirty and dusty blankets and sheets, if they had any. Most of the patients ran a temperature of 104 or 105. Some had complications.

My first and only pay day during the entire summer netted me \$48.00 plus board in the tent.

By September the weather was getting colder and I borrowed \$25.00 and bought a wood burner box stove and two blankets. George Watts and D. B. Austin, civil engineers, living under much the same conditions in another camp, helped me cut some wood. My attempt to split wood tired me. I had been running a low temperature for about three weeks but kept going until one morning, three days after I bought the stove, I did not have enough ambition to get up until someone came and wanted to know why I did not go to see my patients. I was weak, could hardly stand, temperature 105 at 10 A. M. I realized I was through.

I was sent to St. Mary's Hospital in Duluth where Dr. S. H. Boyer took care of me for two months. After leaving the hospital I was

laid up with phlebitis at my father-in-law's home, in Milwaukee, for three months.

I returned to Eveleth with my wife in February, 1895. There had been an number of buildings put up: two double two-story buildings, one of which was used as a hotel by Mr. Charles Jesmore, the other a drug store and clothing store with rooms and office upstairs. We lived in the hotel and I rented the only available room over the drug store for an office; and so I went to work again, considerably handicapped this time by being obliged to use a cane.

I kept, as an assistant, the young physician who had been looking after the work during my absence. We had no hospital, but there was an empty, one-story building, boarded on the inside of the studding only, which we made habitable by boarding up to the ceiling of the first floor on the outside and nailing some building paper on the inside and filling the space with sawdust. We put up two beds and heated the room by the box stove I had bought five or six months before. This makeshift answered for a hospital for several months, when I had another one built—twenty-five by forty feet, one-story, but warmer, and plastered and filled with hospital beds. At one time we had nine patients with fractures, including a broken spine and a crushed pelvis.

* * *

Meals were brought from a nearby boarding house. This building served until 1900, when we moved into the present building, to which two additions have been made.

During the earlier years of my practice, before antitoxin was discovered, I had the same experience that many doctors have had with little diphtheria patients. Mild cases convalesced in one to three weeks; others died. In the so-called croupous cases, the exudate developed in the larynx primarily or by extension; a few would recover after a stormy time but all too frequently, in other cases, the throat would fill up, respirations would become more and labored, and the child die of asphyxiation or exhaustion. Tracheotomy was frequently resorted to with varying results. Then O'Dwyer presented the medical profession with the intubation tube, to be put in the trachea through the mouth. About 1894, while taking the postgraduate course in New York, I received practical instructions in its use on baby cadavers. To use it, the child was

wrapped firmly in a sheet and held in someone's lap, who placed one arm around the child and, with the other on the forehead, held the head against his shoulder. A gag held the mouth open and the tube was quickly inserted into the trachea and what a relief it was to the parents and the doctor to see the child breathe easily and drop off to sleep. That was ideal. Unfortunately, it could not always be obtained. Sometimes the tube could not be placed so easily; occasionally the throat would be so filled with exudate that some of it would be pushed down ahead of the tube, plug it up so that the child could not breathe and tracheotomy was quickly resorted to, but too often the baby's big round eyes would roll toward me, the head would fall to one side and the baby was dead. I hope none of you will ever witness such a picture. We older ones have reason, by experience, to appreciate, and be thankful for, diphtheria antitoxin and other modern means to prevent or cure contagious and other diseases.

The history of diphtheria, or putrid sore throat, as it was sometimes called, and its clinical symptoms, is interesting reading.

I will omit the details of my first thigh amputation on the Range, except to say it was done at 11 P. M. The young man who did chores around my house and office and took care of my horses handled the anesthetic after my associate had gotten the patient to sleep. The night policeman held the small kerosene lamp and the amputation was quickly done by the transfixion method.

* * *

The following was reported to me as occurring during the nineties. A miner at Soudan, Minnesota, had a badly united fractured arm and threatened to sue the mining company unless the arm could be made useful. The mining company doctors attempted to correct the deformity, but the patient died on the operating table. The doctors, after using every means to resuscitate him, passed a needle between the ribs to his heart in a desperate attempt to stimulate it to action. His wife, who was present, quickly spread the story among the people of her nationality that the doctors could not kill him fast enough with the chloroform and stuck a knife in his heart, and they threatened dire vengeance against the doctors. It was reported that the doctors carried revolvers for some time

afterwards as a protection, but I cannot vouch for it.

One evening in the early fall of 1897, a few years after I heard the above story, I was summoned to a boarding house to see a man called Oscar, who had supposedly shot himself. Arriving, I noticed twelve to fifteen men sitting in chairs on the side of the room. None offered me a chair and nothing was said as I entered. When I inquired where the patient was, one man pointed to a man lying prone across two chairs near the kitchen stove, his head extending over the woodbox to catch the blood from the wound. After getting him in a sitting position, I saw that his right eye was swollen shut and ecchymosed. I said, "A fight?" Some man said, "No, shot," and pointed under his own chin. Examination under the patient's chin showed powder marks and a bullet hole, from which blood trickled. There was a hole through his tongue and the roof of his mouth. When he tried to swallow the fluid would pass through the hole in the palate to his nostril and this made him angry and irritated him. While examining the head for evidence of an exit for the bullet, I found a large hole in the back part of his head. Someone said he had had that before. More careful search revealed crepitus and a loose bone in the upper part of his forehead in line with the bullet holes. I gave him some mouth wash and left.

The next morning someone came for me and said Oscar's friends wanted something done. My associate and I responded. As we entered the house, we noticed a self-appointed jury of twelve men sitting in two rows of six each in a corner of the room. I realized at once that they had formed a jury to watch my operation with the intention of preventing a recurrence of the incident at Soudan.

As a matter of self protection, I told the foreman of this jury, who could speak English, that the patient might die, and if I said, "Raise him up," he was to have four men instructed to step up on the table and raise him up in an inclined position with head down. The patient was placed on one end of the twelve to fourteen foot dining table in the kitchen and given ether. As I made the preliminary curved incision, the patient stopped breathing and I turned to the jury and said, "Raise him up." Four men stepped up on the table and quickly did as I had in-

structed them. Following artificial respiration and a hypodermic of strychnin, respiration was restored and the bullet, with a few pieces of bone, was removed and the wound stitched. The patient made an uneventful recovery but was



Fig. 1. Skull showing bullet hole in frontal region.

greatly annoyed by the fluid passing through the roof of his mouth to his nose.

Two or three months later, some of his friends came to me to inquire if I knew what had become of him. They said he had started for Ishpeming but never reached there. I knew nothing about him.

About two years later a skeleton was found in the woods, not far from the sporting houses, which were to be found in every mining village. There was a piece of rotted rope hanging from a limb of a tree above. The shoemaker recognized the heel of the rotted shoe as belonging to my former patient. Some of the curious who viewed the skull advanced the theory that he had been shot in the nearby sporting house while in a stooping position; that the bullet had entered the forehead and had come out from the large hole in back and that the rope on the limb had been placed there as a blind.

A sheriff came up from Duluth to investigate. He asked me to go to the undertaker's in Virginia to see if I could identify the skull. Fortunately I had kept the bullet and pieces of bone.

As they fitted nicely there was no mistake as to his identity. I asked the undertaker if there was to be a funeral. He said no, a county case. I asked if I might have the skull. He said he had no right to give it to me, but that he had to go up town.

* * *

Before the high pressure steam sterilizers were known, the early method of sterilizing dressings was by boiling or using low pressure steam. My first sterilizer was an Arnold low pressure, and dressings had to be exposed to the steam for two hours at twenty-four hour intervals for three days. The steam was supposed to destroy the fully developed germs but not the spores, which did not become fully developed until forty-eight hours after the first steaming.

Another method was to boil some cheesecloth to get rid of the sizing and starch, cut, fold, and roll it in suitable sizes and soak it in 1-1000 bichloride for twenty-four to forty-eight hours, wrap it in waxed papers. These my wife helped me to make. The gauze was then kept in boxes ready for use.

During the early days, the Range towns had no municipal water supply or sewage, and slops and refuse of all kinds were deposited on the ground in the alleys. The alleys consequently were filthy. It was impossible for the village scavenger to keep them clean, and often slops would run into the neighbor's yard, and, in the summertime, flies swarmed the alleys and kitchens and spread disease, especially typhoid fever. In desperation, at my request the village trustees passed an ordinance, prepared by an attorney, compelling people to build a raised platform in the alley and to keep a covered receptacle on it and to deposit their slops or refuse in it and to use lime. The scavenger could now easily remove the slops for the entire village in one day and the alleys were kept clean. Some of these stands were rather unsightly and caused some criticism and amusement. While this method was rather crude, it was the best we could do at the time.

If I should attempt to tell my experiences with hundreds of cases of typhoid fever, with its many complications, it would take too much time and space.

Walking several miles in rubber boots, in order to cross a creek or swamp, to see a patient, or skating across the lake in the early fall, before

the ice was strong enough to hold up a horse and cutter, with a satchel strapped over the shoulders, or walking six or eight miles through the woods to an exploring camp, following a trail sketched out by the civil engineers of the mining company, or helping carry a sick woman through a bog or swamp along a lake shore to a boat, in order to get her to town, were the common experiences of any pioneer doctor and were not considered a hardship.

* * *

I will report a case of prolonged pregnancy that emphasized what nature will do if given an opportunity. A woman of rather short stature, the mother of several children, consulted me regarding the delay in her expected confinement. From her history, she was about two weeks overdue. Examination apparently confirmed her story and she was advised to wait with patience. Almost three months later, I returned home after one week's absence and was met at the railroad station by one of my associates who informed me I would have to do a craniotomy. He said the woman had been in labor three or four days, with no apparent progress, for the past twenty-four hours. He admitted that the babe was viable. It was the woman I had seen three months before. I had never done a craniotomy on a living babe and I could not reconcile myself to do it now. I cannot describe the horror I felt, and I resorted to various expedients to delay the ordeal. After two hours, I drove to the patient's home. Lo and behold—the baby's head had come down on the perineum, much to the surprise and delight of the attending physician as well as to myself. It was an uneventful delivery. The head was full size, round, hard, had not moulded while passing through the pelvis and the fontanelles were hardly discernible. This helped to confirm the patient's history of a prolonged pregnancy or delayed delivery.

Mrs. A. C., aged thirty-six, the mother of two children, consulted me in 1905 for some distress in the lower abdomen. I am unable to locate the history giving her symptoms. There probably would be nothing of value in it. Examination revealed a firm, slightly movable tumor to the left of the uterus, which, upon being removed, proved to be a lithopedion about the size of an orange. It was confined within the

left tube, which was stretched over it as thin as a rubber glove would be. After removing the tube with the tumor intact, I drew a knife across it and the thin tube retracted quickly and completely as though it had been a piece of fresh rubber.

* * *

One New Year's evening, as I was returning to my office over the drug store, I was met by some anxious citizens saying that a man with smallpox had been brought to town from a logging camp a few miles from Eveleth, and that he was in a jumper over there, pointing to the place. (A jumper, as you probably know, is a sled with runners about eight or ten feet long and usually drawn by one horse.)

The man was warmly covered with blankets. I uncovered his face, felt of it, examined it by lantern light and easily confirmed the diagnosis.

As the town had been recently moved from the hollow to its present location, every building was occupied. There was not even a vacant shack in which to put the man. I advised the driver to take him to Virginia, as I knew they had a place for such cases. In about two hours they returned, said the doctor, or health officer, told them he belonged to Eveleth and sent them back here.

After consulting with the village officials, the only alternative left for us was to direct them to return to the camp with a promise that a doctor would drive out there the next day and see him. After prescribing for him, they started back.

In the meantime, the Township and Village trustees hastily swore in a number of deputies and, under the supervision of the Chief of Police, armed them with rifles and sent them out to quarantine the camp of about seventy-five men ("lumberjacks"), as required by law. Some of the men naturally resented this measure, especially the cook, so it was reported, who would shout at the guards through an open window, calling them names and threatening to shoot them if he had a gun. Some of the guards afterward admitted feeling nervous and under tension.

We were very busy the following day and, before we could leave, a messenger came in for a doctor, saying a man had been shot. Dr. A. W. Shaw, now of Buhl, a man of good judgment, and I, drove to the camp. It was a beautiful

moonlight night. As we approached the camp we could see the flare of bonfires at various places through the trees.

The guards were standing about on duty and halted us until they recognized who we were. As we went into the foreman's office, the first



Fig. 2. Lithopedion.

thing that met our eyes was a dead man on the floor. We made a casual examination, so as to report. The foreman's greeting was something like this, "You are a blankety blank bunch of men to shut us up and shoot us down like dogs." We could not blame him. We told him we were there as doctors and not as officers and asked him to go with us into the main camp, but he refused. Dr. Shaw and I went into the camp. Our reception was perhaps not the most friendly, rather tense at first.

Our first act was to see the patient, who was occupying an "upper berth." We then asked the man in the bunk below if he had ever been vaccinated. He replied "No." As we explained the advantage of vaccination, some gathered around and appeared interested and favorably impressed; others were inclined to make trouble, to "act smart" as it were. One said he had been vaccinated "and had nearly lost his arm." The same story you all have heard over and over. He showed us a large scar on his arm and we agreed with him that he had had a hard time of it and that he had gotten it infected, probably by scratching it. It was not wise to get into an argument with these men. Before we left, we had vaccinated between fifty and sixty men.

It seems that the man who was shot was in the stable with others, helping take care of the

horses. When the dinner horn sounded he did not leave immediately, so one of the guards ordered him in. He started toward the guard, who slipped a cartridge in his gun and shot him. The guard was arrested and tried, of course, and the woodsmen testified against him. The judge understood the situation and said, "If

you were younger, I would sentence you to the reform school," but as it was he sent him to the penitentiary for an indefinite period. As he entered the prison, the warden greeted him with, "Hello Anderson! You back again?"

It pays to select our officers, especially policemen, with care.

LATENT SYPHILIS*

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SINCE the advent of malariotherapy there has been considerable discussion of the defensive mechanism of the syphilitic, much more in fact than at any time since Ehrlich introduced salvarsan, in 1910. At that time, it was expected and hoped that a specific agent for the treatment of syphilis was at hand; however, two decades have now passed, and experience has proved that arsphenamine does not possess all the qualities of the ideal specific. To be thoroughly efficient in the treatment of early syphilis, arsphenamine must be augmented by either bismuth or mercury; thirty injections of arsphenamine with twice as many injections of one of the heavy metals will result in the cure of approximately 80 per cent of the patients who have early syphilis. In the malignant types of the disease, such, for example, as general paresis and aortic disease, the curative effect of arsphenamine is but slight. Between these two extreme types, the benign forms of syphilis of the skin or bone may be cited as examples of lesions in which arsphenamine, when combined with mercury or bismuth, results in the rapid healing of and arrest of the disease process in most of the cases. In brief, then, it may be said that in cases in which the parenchymatous complications of the disease have become manifest, arsphenamine seldom prevents the progress of the condition, although in cases in which the less vital structures are involved, the complications are less serious and the results from the use of arsphenamine are usually most satisfactory.

It is the purpose of this paper to call attention to that phase of syphilis known as latent syphilis,

which may be defined as that period of the disease when neither clinical signs nor symptoms are present. It may also be thought of as the concealed phase of syphilis. In the study of the Coöperative Clinical Group latent syphilis was divided into the early and late forms. Early latent syphilis includes those cases in which syphilis has been present for less than four years, while late latent syphilis includes those cases in which the disease has been present for more than four years. The reason for this subdivision is the fact that in the majority of cases of syphilis there is evidence of an effort of a defensive mechanism to develop in the first four years of the disease. An illustration of this is the tendency of the spinal fluid of many patients with asymptomatic neurosyphilis to become negative spontaneously by the fourth year of the disease, and the fact that the infectious types of clinical relapse seldom appear after the fourth year. On the other hand, after the disease has been present for four years, the incidence of the clinical manifestations of neurosyphilis increases each year thereafter. The study of the Coöperative Clinical Group and the report of Bruusgaard offer evidence of the fact that syphilis sometimes is controlled spontaneously.

Latent syphilis also has been divided into clinical, serologic, and pathologic latency by Moore, and it will be considered briefly under these headings.

Clinical Latency

Clinical latency exists when no clinical signs or symptoms of the disease are discernible. This does not imply, however, that syphilitic invasion

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of the viscera has not occurred, because when the aorta or liver is only slightly involved, signs and symptoms are absent. These manifestations of syphilis may remain slight and the patient may be asymptomatic for years. Accordingly, the line of distinction between clinical latency and asymptomatic visceral syphilis may not be well marked, and at times constitutes a difficult diagnostic problem. Latent syphilis clinically may follow one of two courses: It may remain as such for the rest of the patient's life, during which he will remain free of symptoms and signs of the disease. On the other hand, visceral syphilis may become recognizable after several years of such latency. The important point to bear in mind in regard to the management of syphilis, which is latent clinically, is that in some of these cases extensive treatment is warranted, while in others only observation and frequent reexamination are indicated. In the consideration of the treatment of latent syphilis, this point will be considered in detail.

Serologic Latency

Serologic latency implies that although the serologic tests are negative the patient still has active foci of syphilis. Ten years ago, when the serologic technics were less sensitive than they are at present, serologic latency was very common. However, with the newer flocculation tests, serologic latency is a phase of syphilis which is now encountered less frequently than it was in the past. With the advent of more sensitive serologic technics, which no doubt will be developed in the future, serologic latency will be even less common than it is now.

Pathologic Latency

Pathologic latency means that active *Spirocheta pallida* are present in tissue but that a pathologic reaction on the part of the host to the invader, in the form of a minute or massive gumma, is lacking. This conception of latency was fostered by Warthin, who demonstrated *Spirocheta pallida* in the cardiac muscle and testes of latent syphilitics, in the presence of mild pathologic changes. For some time, this was the basis for the conception that latency was characterized by the development of nests of *Spirocheta pallida* which might remain dormant for years, or might at any time become active and

produce clinically recognizable manifestations of the disease. The proof that the state of pathologic latency exists is dependent on the findings at necropsy, and is a pathologic problem which is still subject to debate.

Diagnosis of Latent Syphilis

The diagnosis of latent syphilis is made by the process of exclusion, as such a diagnosis can only be made after careful search has failed to elicit any evidence of syphilitic disease of the viscera or nervous system. A history of the primary or secondary manifestations of syphilis helps to place the disease either in the early or the late phase of latency, and if the history of primary or secondary syphilis is lacking, a classification into early or late latency may not be possible. An examination of the spinal fluid is essential for a diagnosis of latency. If the reaction of the spinal fluid is positive, the diagnosis of latency is immediately discarded, and the type of neurosyphilis, such as asymptomatic, cerebrospinal, or parenchymatous, is sought. If the serologic tests on the blood and the reaction of the spinal fluid are negative, and if the history reveals evidence that the patient has had an acute syphilis which was adequately treated, and if no signs of syphilis are manifest, the diagnosis of latent syphilis may be made. On the other hand, if the serologic tests on the blood are positive and if the reaction of the spinal fluid is negative, and if there is a history that the patient has had acute syphilis which was adequately treated, the diagnosis of latency is possible only after a thorough clinical examination has failed to disclose evidence of syphilis. Such an examination should include careful scrutiny of the cardiovascular system, including roentgenologic examination for evidence of aortic enlargement; and examination of the nervous system, fundus oculi, the viscera, and the osseous system, for signs of syphilis. The mucous membranes must also be scrutinized because syphilitic leukoplakia frequently may be the only clinical manifestation of syphilis. If such a detailed examination fails to elicit involvement of any of the systems mentioned, in the presence of a negative reaction of the spinal fluid, the diagnosis of latent syphilis is warranted, even though the serologic tests on the blood remain positive.

Mention already has been made that the patient who has latent syphilis should either be

treated or placed under observation. The study of the Coöperative Clinical Group showed that if a group of latent syphilitics was observed for ten years, spontaneous cure would be noted in from 25 to 35 per cent; in an additional 25 to 35 per cent, the patients would remain Wassermann-fast; in 10 to 15 per cent, late syphilis of either the skin, mucous membrane, or bones would develop; in 10 to 15 per cent, cardiovascular involvement would be noted, while in 1 to 3 per cent, syphilis of the central nervous system or viscera would become manifest. As there are numerous factors which influence the decision as to whether a patient with latent syphilis should be treated or not, I shall report several cases which emphasize the significant reasons for the therapeutic program of this phase of syphilis.

Report of Cases

Case 1.—A farmer, aged sixty-five years, had acquired syphilis thirty-five years ago. The syphilis had been recognized at that time, the chancre had been cauterized chemically, and some mercury pills had been taken at irregular intervals for less than a year. He had married ten years after he had acquired the infection; his wife never had become pregnant. He came under my observation because of a positive Wassermann reaction on the blood, which was discovered in the course of an examination preliminary to surgical repair of bilateral inguinal hernias.

The physical examination demonstrated bilateral inguinal hernias, but examination of the cardiovascular system, including a roentgenologic study, did not reveal any abnormality. The neurologic examination and the examination of the ocular fundi did not reveal anything abnormal. No history or findings of visceral disease were elicited. The mucous membranes did not show any evidence of leukoplakia. Examination of the spinal fluid did not reveal any abnormality.

In brief, this is the story of a sixty-five-year-old man who has had syphilis for thirty-five years and now has only a positive Wassermann reaction to show for it. It is known that practically all the serious sequelæ of syphilis are manifested clinically between the twelfth and eighteenth years following the acquiring of the disease. As this patient has had the infection for thirty-five years and does not present any clinical signs of syphilis, the probabilities are that no serious complications of syphilis will develop from this point on. Examination of his wife, which included a Wassermann reaction of the blood, did not reveal anything abnormal.

As the absence of signs and symptoms of syphilis was more significant than the positive Wassermann reaction, the patient was placed under observation or "on parole." He reported for annual examinations, particularly of the cardiovascular system, and as the examination failed to reveal anything abnormal in three years, he subsequently was discharged. There is no indication to attach significance to this positive Wassermann reaction; in fact, repetition of the serologic test at each annual examination is not necessary, because the positive report "per se" is of no significance. In this type of case, the importance of the serologic report should be minimized. "Do not treat the positive Wassermann." In such a case, if any of the annual examinations arouse suspicion that the syphilis has produced visceral disease, treatment may be instituted immediately.

Case 2.—A widow, aged forty-two years, came to the clinic because of disease of the gallbladder. Although her husband had died five years previously of aortic aneurysm, no history of primary or secondary syphilis could be elicited. Since her marriage twenty years previously, she had become pregnant three times; the first two pregnancies had ended in miscarriages, and the third pregnancy had terminated in a stillbirth. She had had a pelvic operation three years after the last pregnancy, when both fallopian tubes and one ovary had been removed.

The physical examination revealed an obese, middle-aged woman. Roentgenologic examination of the gallbladder showed the presence of gallstones. The serologic test on the blood was positive, but the spinal fluid was negative in all factors. The examination of the cardiovascular and neurologic systems did not reveal anything abnormal, and no evidence of syphilis was elicited in the eyes, bones, or mucous membranes. The syphilologist could find no objection to proceeding with surgical operation. The gallstones were found and removed; an examination of the liver did not show any signs of syphilis. The convalescence was uneventful.

A widow, aged forty-two years, probably had acquired syphilis from her husband, shortly after her marriage twenty years previously. She presented only positive serologic tests on the blood. She had never received any antisyphilitic treatment. Perhaps criticism would be made of permitting such a patient to undergo an abdominal operation from the standpoint that the surgeon would be subjected to the risk of infection and that the patient might encounter postoperative complications in the healing of the wound. In answer to the first criticism, sufficient evidence

is now at hand to warrant the statement that when syphilis has been present ten or more years the condition is not infectious, to all practical purposes. The likelihood that the surgeon or his assistant would acquire syphilis from such a patient is very slight. In regard to the effect of operation on a patient who has latent syphilis, my experience has impressed me with the fact that the danger therein is twofold: first, the effect of the surgical trauma on a syphilitic process elsewhere than at the operative site; and second, the surgical disturbance of a gummatous process. For example, an unrecognized aneurysm may rupture as a result of operation which involves the abdomen; on the other hand, if the mass for which the operation is performed is gummatous, healing of the wound will not occur as the gumma will recur and extend rapidly. In the case under consideration, the evidence of visceral syphilis was lacking, and the removal of the gallstones was warranted because of frequent colics.

Following the operation, the presence of syphilis was discussed with the patient and an effort was made to minimize the positive serologic test on the blood, but only after she had agreed to report for annual examination. Three years after the cholecystectomy, and shortly after she had completed the menopause, she sought our approval in regard to marriage. Our approval was readily granted. Reexaminations have been made at irregular intervals for the past ten years. She has not infected her husband, she has never had treatment for the syphilis, and the serologic test on the blood has now become negative. In the Coöperative Clinical Group's study of latent syphilis, it was shown that in 83 per cent of a group of cases of latent syphilis which was observed for ten years or more, the reaction of the blood became negative spontaneously.

Case 3.—At the age of twenty-four years, a woman had been divorced from her first husband because of his infidelity. She had become pregnant once, but there had been a spontaneous miscarriage. Shortly after her divorce, she had been found to have a positive Wassermann reaction of the blood, for which eighteen injections of neoarsphenamine and thirty mercurial inunctions had been administered. Five years following this treatment, at the age of thirty years, she consulted me in regard to remarrying. The serologic tests on the blood were positive, but the spinal fluid was negative in all details. Examination of the cardiovascular system did not reveal anything abnormal, and no clinical evidence of syphilis could be found. In the

discussion of the situation with her, it was obvious that she was anxious to have a child; in fact, she was opposed to the use of contraceptive measures of any sort. Accordingly, she was urged to continue with treatment and to postpone her marriage for three years. The treatment suggested consisted of two courses of bismuth, twenty injections to the course, each year for the following three years. At the end of the administration of the bismuth the reaction of the blood for syphilis had become negative and she was married. She has not as yet become pregnant.

The significant features of this case are the following: Positive serologic tests are more common in those cases in which patients receive not only an inadequate amount of arsphenamine, but, particularly, an insufficient amount of bismuth or mercury, than they are in other cases. Secondly, it is significant that, in cases of latent syphilis in which the infection is more than four years old, the intensive use of bismuth is rewarded by a higher percentage of reversal of the serologic test on the blood to negative than when arsphenamine is administered and the bismuth is omitted or administered in a small number of injections. A third point, not brought out by this case but nevertheless worthy of emphasis, is that 17 per cent of the pregnancies in cases in which there is late latency will result in syphilitic children. Accordingly, if this patient becomes pregnant, she should undergo intensive treatment with arsphenamine and bismuth, even though the serologic test remains negative, in order to assure her of a nonsyphilitic child.

Conclusions

1. Latent syphilis may be divided into early and late latency, according to the duration of the syphilis, as during the first four years of the infection the patient is in the process of developing a resistance to the disease.

2. Latency is diagnosed by the finding of a normal spinal fluid and the complete absence of clinical signs or symptoms of syphilis. A negative or positive Wassermann reaction of the blood is an insignificant factor in the appraisal of latency.

3. The need for the treatment of latent syphilis is dependent on the duration of the syphilis, the age of the patient, the absence of clinical signs or symptoms, and the possibility of pregnancy, rather than on the status of the blood.

4. Latent syphilis tends to produce negative serologic tests when observed for a ten-year pe-

riod. The highest incidence of reversal of the serologic test on the blood to negative in latent syphilis occurs following the intensive use of bismuth, augmented by a comparatively small amount of arsphenamine, given by the continuous or modified continuous system of treatment.

5. Latent syphilis, diagnosed by exclusion and elimination of all possible complications of syph-

ilis, tends to remain latent in the majority of cases.

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THE LOW BACK PROBLEM*

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THE subject assigned to me is "Low Backache, Sciatica, Congenital Abnormalities, Posture, and Sacro-iliac Strain"—in fewer words, the Low Back Problem. The diagnosis of low back pain is one of the most difficult in orthopedic surgery; but these days of automobile accidents with their pending litigation, of compensable industrial injuries, and of governmental relief make the problem still more complex. Now-a-days the surgeon must look askance at subjective complaints in many of these cases because of possible legal complications which may follow. Not only must the true cause of the pain be determined and treated, but often the extent of aggravation of pre-existing dormant disease must be estimated. In most cases the problem can be solved by a careful history, a thorough physical examination of the back, good x-rays, a clear understanding of the pathology common to the region, and a vast amount of patience.

The history must be carefully taken, and it must be recorded, to be of value, for frequently a legal mind can bring out a history quite different from the one given the surgeon. Previous illnesses should, of course, be noted, especially rheumatism and venereal diseases. The history and dates of previous accidents, fractures, and operations is very important. The exact date (and mode) of onset should be established if possible, and, if traumatic, whether such trauma operated directly or indirectly. In accidental

cases Liniger's postulates, given by Kessler,⁷ should be considered as follows:

1. The accident must be proved without doubt.
2. The injury must be sufficiently severe to cause immediate cessation from work.
3. The symptoms must appear immediately (or within a few days) after the accident, and persist continuously.

Etiology

Assuming the complaints to be true, one must consider their possible and probable etiology. In the lower back the fascia, muscles, nerves, ligaments, articulations, and bones are to be considered, and each of these tissues is subject to its own host of pathological changes.

Arthritis.—The commonest cause of low back pain is osteoarthritis. This is conclusively shown by the statistics of Miltner and Lowendorf.¹⁰ When arthritis is present the surgeon often must determine whether it was produced by trauma, or aggravated by trauma to a disabling degree. One must be cautious to be fair in cases where litigation is involved, and remember that an aggravation, per se, must ultimately heal; and that a spondylitis may pass through its dormant period and progress to ankylosis without any trauma at all.

Posture.—Excluding arthritis, general toxic conditions, and neoplasms, the effect of faulty posture on the lower back is probably next in

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importance. Whether increased sacral inclination is the cause or result of faulty mechanical use of the body is still being debated, but there is no doubt that the increased sacral inclination present in most individuals puts the lumbo-sacral articulation at a mechanical disadvantage. Poor abdominal musculature permits increased sacral inclination and as this inclination increases beyond the average of 42 degrees, the strain is thrown first upon the ligaments, which stretch under chronic stress, and next upon the articulations. Following Wolf's law, that form depends upon function, the intervertebral disc between the fifth lumbar vertebra and the sacrum becomes more wedge-shaped and much of its shock-absorbing function is lost. Dickson² found that 35 per cent of his cases presented "such an architecturally weak articulation" and considered it the "causative factor, not only in predisposing the lumbo-sacral joint to injury, but in the persistence of symptoms."

Anatomic Variations.—Congenital abnormalities, or anatomic variations, are very common in the lower back region, and there has been such controversy about their importance in cases of low back pain. George² found that "35 per cent of all spines x-rayed for any purpose showed congenital abnormalities," but common sense dictates that the large majority of these do not produce symptoms of themselves. Dickson² takes a rational view in considering congenital defects "important in that they cause weakness in the spinal architecture, thus providing points of lowered resistance to strain and rendering the spine more vulnerable to injury." The author⁵ in a series of 100 consecutive cases of back strain found abnormally placed articular facets in 63 per cent of the series—too high a percentage to ignore. Certainly a spine is potentially mechanically weak whose postero-lateral articulations are not the same on right and left sides. When the laminae of the fifth lumbar or first sacral segments fail to fuse, the erector spinae muscles have a fibrous origin instead of a bony origin and the region is more vulnerable. Spina bifida occulta presents a similar but more vulnerable area. Unilateral sacralization is frequently a cause of pain especially when arthritic changes obtain in the adventitious joint between the sacrum and transverse process. Butterfly transverse processes on the fifth lumbar also predispose to strain and may even produce a list.

Bilateral sacralization gives apparent strength to the fifth but really forces the normal range of flexion at the lumbo-sacral joints onto those of the fourth lumbar, and so pre-disposes to strain. Combinations of these defects certainly increase the vulnerability of the back.

Intervertebral Disc Changes.—Due to improved x-ray technic, and the work of Schmorl in Dresden, the intervertebral disc is becoming recognized in spinal disease. Many variations in the discs do occur, but the consensus of opinion seems to be that most of the changes seen in x-rays of the discs are without clinical significance. Williams¹³ has shown that disease in the disc between the fifth lumbar and the sacrum may lead to loss of the disc with narrowing of the intervertebral foramen and sciatica. Lumbo-sacral facetectomy was necessary to relieve the pain in his cases. Schmorl's bodies, or herniation of the discs into the vertebral bodies, are probably of no clinical significance, but occasionally the annulus fibrosus may rupture posteriorly and allow prolapse of the nucleus pulposus into the neural canal as found by Mixter and Barr¹² in nineteen cases at operation. Such cases present true neurological findings, however, and must be rare.

Accidental Injuries.—Traumatic injuries to the lower back seem to be increasingly common. The simple contusions, tears of lumbo-dorsal fascia, and partial ruptures of muscles, are usually easily diagnosed from the history of accident and the physical signs. The tenderness in these injuries is quite superficial and sharply localized—constantly in the same spot. There may be muscle spasm in these injuries, and it is important to remember that the pain of muscle spasm is referred to the area of the muscle group and not to the point of injury. Muscle spasm is limited to a muscle group and is usually present during rest as well as during action; moreover, the spastic muscle is tender even at rest, and the contracted muscle bundle is usually palpable. Voluntary muscle contraction involves a larger group of muscles, and while it may be protective, it may also be exaggeration.

Sprains.—The severer injuries, involving the ligaments, are more perplexing because of the necessity for differential diagnosis between lumbo-sacral and sacro-iliac lesions. In some cases both are involved, and the history and subjective complaints do not help in differentia-

tion. Both lumbo-sacral and sacro-iliac lesions may present a list, muscle spasm, limited motion, and tender points. In general, sacro-iliac cases present less limitation of spinal flexion when seated, and lumbo-sacral cases are negative to the crest-compression test. As Key⁸ has pointed out, "the most important differential point is the localization of the acute tenderness. In lumbo-sacral strains this is just above and mesial to the posterior superior iliac spine on the side of the lesion, and in sacro-iliac cases the tenderness is most acute over the posterior inferior spine and sacro-sciatic notch." Sacro-iliac strains are rare in men. The recent paper by Brahdya is the clearest explanation of these physical signs that has appeared to date, and is worth careful study.

Isolated Fractures.—Mitchell¹¹ has drawn attention to fractures of the articular processes of the lumbar vertebræ with the interesting observation that such fractures show a strong tendency to non-union. Fractures of the spinous processes are usually due to direct violence, and sometimes they do not unite and may require excision if troublesome. Fractures of transverse processes may be due to direct or indirect violence, and those of the second, third, and fourth lumbar are the most susceptible to fracture. These fractures are characterized by point-tenderness over the fracture, and pain on hyper-extension of the thigh, or flexion of the thigh against resistance. Fractures of the pedicles and laminae are rare and are usually due to direct violence or twisting forces. They are difficult to diagnose with certainty except when associated cord signs warrant open operation. Compression fractures of vertebral bodies occur usually in the dorso-lumbar region, but occasionally the lower lumbar are also fractured. Marginal fractures of the bodies also occur, but these should offer no particular difficulty in diagnosis. One should never be satisfied with mediocre x-rays of this region; good, clear fine-focus work is necessary to determine whether a compression fracture is recent or old—and sometimes this important distinction saves much embarrassment in court later on.

Spondylolisthesis.—Forward displacement of the fifth lumbar on the sacrum may be due to congenital anomalies, or it may be traumatic as the author pointed out years ago.⁴ The difficulty with this condition lies in the determina-

tion of whether injury caused the displacement, or aggravated a pre-existing condition. Meyerding⁹ considered spondylolisthesis traumatic in about 40 per cent of his cases. So far as I know, no one has ever reduced, or replaced, a spondylolisthesis. The condition must be fused where it is to gain permanent relief.

Sciatica.—This term signifies a painful condition along the sciatic nerve. Except in those rare cases of real sciatic neuritis which present the reliable signs of atrophy in thigh and calf, sciatica is usually a symptom—not of nerve trunk tenderness, but of hamstring spasm or pyri-formis muscle irritation as Freiberg³ has shown. Perhaps the commonest cause of such irritation is sacro-iliac arthritis, but nearly any of the conditions enumerated above may produce it.

Treatment

A correct diagnosis is necessarily essential to proper and successful treatment of low back pain, but the prognosis depends largely upon whether a normal spine is involved. Injuries to normal spines heal in the same way as injuries to other parts of the body, but require a longer healing period because of the difficulty in fixation and securing absolute rest. Injuries to abnormal spines require a much longer healing period; and "may never return to their former condition capable of functioning under ordinary circumstances" according to Dickson.

In general, the acute cases require rest in bed—usually absolute and continuous rest so long as muscle spasm persists. During this period applications of hot, wet packs, or dry heat, hasten the healing process. Frequently adhesive strapping steadies the back and gives much comfort. Diathermia, especially the new short-wave type, is of great value in relieving pain in acute cases, but only when it is readily accessible. The various therapeutic lamps have no particular superiority over wet and hot packs—in spite of the claims made for them which border on quackery.

The severer cases with isolated fractures, a list, or deformity, sometimes require manipulation under anesthesia, followed by absolute immobilization in a close-fitting plaster of Paris jacket. These jackets are best applied in slight hyper-extension to relax the muscles; they should be molded well in over the iliac crests in order to securely grasp the pelvis. Usually the plaster jacket is supplanted by a brace as the condition

improves. The Osgood type of brace with its butterfly pelvic girdle and axillary-crutch support offers the best immobilization but must be made from a plaster cast. The Goldthwait, or Boston back brace offers good support to the lower back and is not so cumbersome to wear. One must not overlook the dangers of too long a period of immobilization when employing jackets and braces. The patient may become too dependent upon this support, and too prolonged immobilization may lead to stiffening of the spine or aggravation of spondylitis. Braces should be discarded gradually and graduated exercises should be taken during this period with gentle massage. Too early resumption of full function is also to be avoided and it is well to caution the patient against bending, stooping, lifting and long automobile rides on his return to activity.

Patients with injury superimposed on congenital abnormalities, spondylolisthesis, and isolated fractures may fail to respond to such routine therapeutic measures as outlined above. Such cases require fusion operation. The simplified technic of spinal fusion which I have reported⁶

is practically free from shock and offers almost certain fusion if carefully performed. Fusion is to be reserved, of course, for special cases, and those which recur after recovery. Postponement of definitely indicated operative treatment only prolongs the healing period and increases the disability.

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CASE REPORTS

INTESTINAL OBSTRUCTION COMPLICATING TWIN PREGNANCY*

ROBERT E. PRIEST, M.D.

Worthington, Minnesota

Intestinal obstruction during the course of pregnancy occurs rarely. Cases are reported in medical literature from a variety of causes. Drew-Smythe's case was due to pressure of a hydrocephalic head on the colon at the brim of the pelvis.⁵ Adhesion of the hepatic flexure of the colon to a gangrenous gallbladder during pregnancy is reported by Beasley.² Ridler⁶ found volvulus of the pelvic colon which he relieved and his patient delivered uneventfully, four weeks later. J. Whitridge Williams,⁷ in the 1930 edition

of his "Obstetrics," stated that he had seen but two cases of intestinal obstruction complicating pregnancy. One of these was due to intussusception at the site of a tuberculous ulcer, and the second to constriction of the bowel by a peritoneal adhesion following tuberculous peritonitis. Another case resulting from adhesions is that of Burke-Gaffney,⁴ whose patient had previously suffered a ruptured appendix with peritonitis, and later an operation for cholelithiasis and freeing of adhesions. Battman and Imerman¹ report a case of obstruction due to gangrenous bowel found when operation was done with a preoperative diagnosis of empyema of the gallbladder. This serves to illustrate the variation in causes of intestinal obstruction during pregnancy, and is not an attempt to survey the literature on the subject.

Because of the unusual nature of the obstructing lesion, and because of the diagnostic difficulties in-

*From the Worthington Clinic

volved, a review of my case with necropsy findings is given here.

Report of Case

Mrs. M., aged twenty-nine years, came to the clinic for prenatal care, March 8, 1935, having menstruated last on December 15, 1934. She had been delivered of twins three years previously at her first pregnancy, and she was then pregnant for the second time. At this examination the abdomen was normal to palpation and the uterus could be felt just above the symphysis. The patient said that she felt very well. Urinalysis was normal and the blood pressure was 124/70. General physical examination was negative.

The patient was seen again May 6, 1935, when she complained of dull pain in the left side of her abdomen at the level of the umbilicus. The pain was worse on lying down and had been present for one week. At this examination, blood pressure was 120/70, temperature 99° F., and pulse 84. A nodular mass, estimated at 6x6x4 cm., was palpated in the left upper quadrant of the abdomen at the upper left border of the pregnant uterus. It was not tender and was thought by a consultant to be ovarian. The possibilities of uterine fibroids and a tumor of the colon were also considered. The patient was instructed to return in one week.

Ten days later, on May 16, the patient called at my office to say that while she was seated at breakfast that morning she had a sudden sensation of diarrhea, and upon investigation found that she was passing bright red blood by rectum. Because of the abdominal mass previously discovered, and this history of rectal bleeding, a tentative diagnosis of tumor of the large bowel was made, and a barium enema was done. This was unsatisfactory on the first trial when the patient expelled the barium because of discomfort before the film could be exposed. The second attempt was more successful, and the colon appeared to fill normally although perfect visualization was impossible because of the pregnant uterus.

A proctoscopic examination was done May 20, and the mucosa of the rectosigmoid appeared normal except for a small bleeding ulcer on the anterior wall, 8 or 10 cm. above the anus. This ulcer was cauterized with 50 per cent silver nitrate.

The patient was admitted to the hospital June 21 because of extreme nausea and moderate intestinal cramps. No food was given by mouth, and large quantities of intravenous glucose in normal saline were given. Temperature and pulse were well within normal range throughout the hospital stay, and the patient's nausea and pain were much improved, though never entirely relieved. Soft foods and liquids were tolerated. The nodular mass, previously palpated, was still present and no change in it could be detected. By palpation it was thought that two fetal heads were present, but only one fetal heart could be located. A diagnosis of twin pregnancy was made by roentgenogram. The patient was discharged from the hospital on June 24, at 4:00 p. m.

At 10:00 p. m. of that day, labor began, and at 11:30 p. m. the patient was readmitted to the hospital. Labor progressed very rapidly, and the first twin (OLA), a boy, was born at 12:35 a. m. The second twin, a girl, presented by the face, and was delivered by internal podalic version and breech extraction at 12:50 a. m. There was profuse bleeding after expression of the placenta, but it was controlled quickly by pituitrin and ergot. The patient's condition on recovering from the anesthetic was good, and continued to be so except for an elevated pulse rate, until 8:00 p. m. the following evening, when she had emesis of 200 c.c. of undigested food, and complained of intense, crampy pain in her abdomen. Hot turpentine stupes

were put to the abdomen, and the pain was controlled by codeine. A large enema, given at this time, returned with formed stool. The patient had a fairly comfortable night, but the next day she was quite distended.

Continuous duodenal suction through a nasal catheter was begun during the evening of the second postpartum day, and the patient was very much relieved. The abdomen became much less tense, but never scaphoid. The suction tube was left in place for one week, during which time the patient received two whole blood transfusions of 500 c.c. each, and 2,000 c.c. daily of 10 per cent glucose in normal saline, intravenously. Turpentine stupes were continued and pituitrin injections given several times daily. The distended bowel gradually resumed its tone and the patient began to pass flatus freely, with some liquid stool. The temperature had always been normal, and the pulse, which had been elevated, returned to a normal rate. The patient took soft food by mouth and when the duodenal tube had been clamped for twenty-four hours during which time there was but one small emesis, the tube was removed. The patient immediately became distressed, pulse rose to 120, and in five hours the duodenal tube was reinserted because of extreme abdominal distention with intermittent, crampy pain. The tube did not give relief this time, and the distention continued. The temperature was 102° F. (oral) at this time. This was the first time since admission that temperature was above 99° F.

Because the symptoms of obstruction had recurred so promptly upon removal of the duodenal tube, and because of the abdominal tumor and its antecedent history, it was thought that the obstruction was undoubtedly mechanical in nature, and that surgical intervention was needed. The patient was referred to Dr. C. F. Dixon of the Mayo Clinic, and it is through his courtesy that the remainder of this case history is presented. The trip to the Mayo Clinic was uneventful, and, on arrival, duodenal suction gave relief of distention. Pulse rate on admission was 134 and temperature, 97° F. The patient was transfused twice, and general supportive treatment given. She was quite comfortable until shortly before her death, which occurred two days later. Her highest temperature reading was 102.4° F. and her pulse rate, just before death, was 160.

A summary of the autopsy report is as follows: perforating carcinoma of the sigmoid, inoperable, with generalized peritonitis and metastases to the aortic lymph nodes. The growth appeared to have been present for many months.

Comment

A case history is presented of a young woman pregnant with twins who died of inoperable carcinoma of the bowel slightly less than two months after the appearance of her first symptoms relating to the tumor. Because the enlarged uterus made palpation of the exact connections of the tumor impossible, and because proctoscopic examination of the rectosigmoid showed seemingly normal mucosa, it was felt that interruption of the pregnancy was not justified.

The diagnosis of colon tumor would doubtless have been made much sooner if the patient had not been pregnant. It is doubtful if the outcome would have been changed because death occurred less than two months after symptoms appeared and, judging from the appearance of the tumor, it must have been present for many months. It is well known that symptoms do not appear early in the life of these tumors

since they produce little stenosis due to the wide lumen of the colon.³

The babies were delivered about six weeks before term. Each weighed less than five pounds and was unable to swallow or suckle sufficiently to nourish itself at birth. They were tube-fed for three weeks and at the time this is written are four months old and doing very well.

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TWIN INTERSTITIAL PREGNANCY*

PETER E. HERMANSON, M.D.

Hendricks, Minnesota

INTERSTITIAL pregnancy is a rather rare complication, occurring less frequently than in other portions of the tube. The etiology of such a condition is not definitely known, although inflammatory changes in the tubes are felt to play a definite part. Interstitial pregnancy almost always results in rupture, and early surgical treatment is imperative.

Glaesmer of Berlin classified interstitial pregnancy into three types, according to the direction in which the ovum develops: (1) growth in the direction of the isthmus; (2) growth in the musculature of the fundus uteri; (3) growth in the lateral wall of the uterus.

Diagnosis is very difficult. Signs which may be present are: (1) a wide base of the uterus and displacement of the round ligament; (2) an oblique upper boundary of the uterus (Simon-Ruge sign) due to the hypertrophy of one of its angles; (3) hemorrhage.

Case Report.—Mrs. M. S., aged twenty-three, had been married three years, but had never been pregnant previous to the time of entrance to the hospital. She was brought into our hospital at 4:00 p. m., October 28, 1935, in collapse, very pale and with definite evidence of an internal abdominal hemorrhage. She had always been well and had had no serious illnesses other

than the usual childhood diseases. The menses had begun at the age of fifteen and had always been irregular, sometimes being absent for as long as three months. The last period had begun on July 4.

The young woman had felt very well until October 19, when she became suddenly ill and went to bed. She felt better that evening and went out, but became nauseated and vomited and had some abdominal pain. She then went to bed and remained there the rest of the week. Her weakness continued and toward the latter part of the week she began to develop some distention of the abdomen. There was no vaginal bleeding at any time during her illness. On October 28, the family physician was called and she was brought to our hospital, arriving about 4:00 p. m.

When first seen, the patient was gasping for air and her mucous membranes were extremely anemic. Dehydration was present and she presented the general picture of an internal hemorrhage. The heart was very rapid but the lungs were clear. The abdomen was distended and very tender over the lower portion. On admission, the temperature was 99.6, the pulse 120 and thready, and the respiration twenty-four.

The blood picture showed: Hemoglobin (Dare), 10 per cent; red blood cell count, 1,290,000; white blood cell count, 50,500; differential—polymorphonuclears 96 per cent, small lymphocytes 5 per cent, eosinophiles 1 per cent, several nucleated red blood cells. A catheterized specimen of urine showed: sugar—none; albumin—trace; numerous hyaline and fine granular casts.

Three relatives who were with the patient were grouped but no satisfactory donor could be obtained at that time. The patient was given intravenous glucose, 10 per cent in distilled water, but died at 10:00 p. m., October 28.

Permission to do an abdominal postmortem was granted. The abdomen was opened and found filled with blood. Two fetuses of approximately three months' gestation were found, floating among the coils of intestines. At the upper right quadrant of the uterus, in the region of the interstitial portion of the tube, there was a perforation which was large enough to admit a finger easily. The placenta was free in the abdominal cavity as well as the membranes, although some membrane was still adherent to the opening in the upper right quadrant of the uterus. The tubes and ovaries were normal, and the stomach, intestines, liver, gallbladder and appendix were all normal except for an extreme anemia evident in all of these organs.



W. W. WILL, M.D.
President, Minnesota State Medical Association

President's Letter

TIME was when the duties of the president of the Minnesota State Medical Association consisted mainly of membership on many commissions and committees of which he never attended a meeting, of presiding over the annual meeting of the House of Delegates and delivering a long and eloquent address at the banquet afterwards.

Those were the days when medical men were banded together chiefly for scientific advancement and the presidency was simply an award of professional distinction.

Those days are past. The president of 1936 is confronted with real tasks and real responsibilities.

Today it is not merely a question of maintaining scientific standards but of defending the very citadel of individual freedom and personal rights in the United States.

Once the socialization of medicine was a purely academic question. Now it is regarded by too many active propagandists as a practical possibility for legislation at this Congress, or the next.

The social and economic implications for the entire population cannot be overestimated. Upon the physician, first and foremost, now rests the burden of defense of the rights of the individual.

I am humbly aware of the honor done me as president of the Minnesota State Medical Association in these critical times. I am also acutely aware of the difficulties and the responsibilities that lie ahead and grateful that there is a distinguished, wise, and active group of officers, committee members and councilors in Minnesota to advise and assist me at every step.

These men have proved their unselfish devotion to the profession of medicine over many years. But in these difficult times it is not enough for the officers to devote themselves to our work. We shall not survive the social upheavals of the times unless every single member is aware of our responsibilities and our problems.

Today, I ask the coöperation and assistance, not only of my colleagues on the Council, but of every single member of the Association.

We as physicians and professional men are dedicated in a very special sense to the public welfare. We must choose our course well. If, then, we maintain a united front, neither direct attack nor subtle propaganda, will prevail against us.

W. W. WILL.

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J. R. BRUCE, Saint Paul

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Retrospect and Prospect

With the advent of a new year we are prompt-
ed to reflect on the occurrences of the past year
and to look forward to activities in the year
1936.

One of the outstanding losses which the past
year brought to the Association was the passing
of Dr. Herman Johnson, for so many years
chairman of our Legislative Committee. His un-
selfish devotion and outstanding ability in pre-
senting the views of the profession to the legis-
lature and in obtaining action will be greatly
missed. Dr. L. L. Sogge, who has been very ac-
tive in Association affairs, has consented to carry
on as chairman of the Legislative Committee and
deserves the united support of members of the
profession. Dr. Johnson's successor as delegate
to the American Medical Association will be
elected by the House of Delegates of the State
Association at their next meeting, which will be
held just prior to the meeting of the American
Medical Association.

Our last annual meeting, held in Minneapolis
in June in conjunction with the Medical Section
of the American Association for the Advance-
ment of Science, had an all time record attend-
ance. Our 1936 meeting will be held in Roches-
ter, May 3 to 6, inclusive. Last year some six-
teen guest speakers from outside the state made
up most of the scientific program, an innovation
which will not be continued this year, as mem-
bers of the Association will provide the bulk of
the scientific program. Clinics at St. Mary's
Hospital will constitute the early morning pro-
gram each day at the Rochester meeting. The
program committee, consisting of the chairmen
and secretaries of the Medical and Surgical Sec-
tions, is as follows: Medical Section—Dr. Frank
J. Hirschboeck, chairman, and Dr. Charles N.
Hensel, secretary; Surgical Section—Dr. Gordon
B. New, chairman, and Dr. Theodore H. Sweet-
ser, secretary. The committee has lined up the
scientific program and already more exhibit
space has been sold than at the last Rochester
meeting.

The State Association will be led this year by
Dr. W. W. Will of Bertha. Born in Blue Earth
County, trained medically at our University
Medical School and a practitioner at Bertha for
thirty years, Dr. Will is a Minnesota product.
Having been a past president of both the Upper
Mississippi Medical Society and the Northern
Minnesota Medical Association and for some
twelve years a Councilor for the Seventh District
of the Minnesota State Medical Association, Dr.
Will is well prepared to perform the duties of
his new office.

The Mayo Clinic and the profession of the
state and nation sustained an irreparable loss in
the death of Dr. E. Starr Judd, the surgeon, and
Dr. George E. Brown, the internist, who died
only a day apart. Dr. Judd had endeared himself
to members of the profession generally through
his unassuming personality and his ability as a
surgeon. He possessed not only remarkable sur-
gical technic, undoubtedly fostered by an im-
mense experience, but in addition sound surgical
judgment—two assets of a real surgeon. Dr.
Brown, in the less spectacular field of internal
medicine, had also made his name known na-

tionally through his work on vascular diseases when he was cut down in his prime. The places of both these men will be hard to fill.

At the University of Minnesota two outstanding changes in personnel deserve mention. Dr. Richard E. Scammon, who had been Dean of Medical Sciences at the Medical School since his return from the University of Chicago several years ago, was honored with a distinguished service professorship. This appointment relieves him of burdensome administrative duties, enabling him to devote his time to scientific investigation. Dr. Harold Diehl, whose industry has been responsible for the building up and efficient operation of the Students' Health Service since 1921, was at the same time appointed Dean of Medical Sciences. He retains his title of Director of the Students' Health Service with Dr. Ruth Boynton as Acting Director.

With the socialistic trends in American life reflected in the state and federal government, there is need as never before for medical organization and concerted action. Innovations in the supplying of medical care should be carefully weighed before time honored methods are put into the discard.

Edward Starr Judd

The sad news of the death of Starr Judd on November 29 came as a shock to his many friends and admirers in the profession.

We like to think that the career of Starr Judd typifies the high plane of medicine in Minnesota. Born in Rochester, Minnesota, and educated medically at the University of Minnesota, this brilliant member of our profession developed with the Mayo Clinic. The large amount of surgical work he was privileged to perform since he, as a mere youngster, became head of a surgical section at the Clinic in 1904 served to develop a natural dexterity and at the same time a surgical judgment, both unsurpassed. Those who came from near and far to attend his clinic said he never made an unnecessary or false move.

Interested in organized medicine, Dr. Judd was president of the Minnesota State Medical Association in 1923. He also served as secretary of the section on surgery of the American Medical Association (1913-1916), chairman of the section (1917-1918), second vice president (1918), and president (1931-1932).

In spite of his many activities, his contributions to medical literature numbered over three hundred and he wrote and spoke with authority.

It was Starr Judd's character, however, that endeared him to all with whom he came in contact. Unassuming and kindly, he never held himself aloof but seemed to meet people on their own plane. Many will miss him with deep regret.

OF GENERAL INTEREST

Dr. Harvey J. Brekke, who has been practicing in Stillwater for several years, has moved to Minneapolis.

* * *

Dr. Max H. Hoffman, who has been associated with Dr. Arnold Schwyzer for several years, with offices at 123 West Seventh Street, St. Paul, has opened offices at 1232 Lowry Medical Arts Building, Saint Paul, where he will continue the practice of internal medicine.

* * *

Dr. Gilbert J. Leonard has been appointed by the State Board of Control as house physician at the State Hospital for the Insane at Hastings, Minnesota. Dr. Leonard graduated from the University of Minnesota medical school in 1926 and has been practicing in Saint Paul since that time.

* * *

Dr. Myron O. Henry of Minneapolis and Dr. J. C. Swanson of Fargo held an orthopedic clinic in Minot, North Dakota, on December 11 for the Crippled Children's Committee of the Elks Club. A large group of patients were examined and recommendations were made for further treatment which will be carried out by the Elks Club.

* * *

A group of physicians from New Ulm and vicinity were addressed last month at the Union Hospital by Dr. Henry E. Michelson, Professor of Dermatology at the University of Minnesota Medical School, who spoke on "Skin Diseases of General Practice," and by Dr. Leo G. Rigler, Professor of Roentgenology, on "Diagnosis of Tuberculous Disease of the Chest."

* * *

The American Board of Ophthalmology will conduct its next examination at Kansas City, May 11, 1936, at the time of the American Medical Association meeting and in New York City at the time of the meeting of the American Academy of Ophthalmology. Applications must be filed at least sixty days in advance of the examination. Forms may be obtained from Dr. Thomas D. Allen, Assistant Secretary, 122 South Michigan Avenue, Chicago, Illinois.

* * *

The eleventh revision of the Pharmacopœia was available December 16, 1935. It will become official

June 1, 1936. The Board of Trustees has decided upon "interim revisions" when indicated. The U.S.P. has served as the foundation of rational therapeutics since the first edition appeared in 1820. As has happened with each revision, the latest volume includes a number of new remedies and some minor changes in those previously included. A "Mild Tincture of Iodine" containing 2 per cent iodine and 2.3 per cent sodium iodide (instead of potassium iodide) is one outstanding change in this last revision.

* * *

The Worthington Clinic celebrated its Fifteenth Anniversary on December 10, 1935, with a banquet at the Thompson Hotel. Those present consisted of members of the staff with their families as well as office employes, nurses from the clinic hospital, and wives of deceased clinic members. There were forty-one persons present. The banquet was followed by musical numbers and addresses.

The Worthington Clinic was organized in the fall of 1920 by Drs. F. G. Watson, F. W. Metcalf, J. T. Smallwood, C. R. Stanley, and B. O. Mork, Sr. Drs. Metcalf, Watson and Smallwood have since died and their places are now filled by Drs. P. W. Harrison, B. O. Mork, Jr., and R. E. Priest.

* * *

The Radiological Review and Chicago Medical Recorder, published at Quincy, Illinois, since 1924, will change its name beginning in January and become the *Radiologic Review and Mississippi Valley Medical Journal*, the official publication of the recently formed Mississippi Valley Medical Society. The editorial policies will be the same as the old *Radiological Review* with the addition of the publication of the papers read before the Mississippi Valley Medical Society. Dr. Harold Swanberg, secretary-treasurer of the Mississippi Valley Medical Society and editor of the old journal, will remain as editor. The Editorial Board of the *Radiologic Review* will be supplemented by an Editorial Board from the membership of the Mississippi Valley Medical Society. The new publication will be published by the Radiologic Review Publishing Company, at Quincy, Illinois.

* * *

Chicago's New Fracture Ordinance

The City of Chicago recently passed the following ordinance designed to prevent as much as possible further injury to the victims of accidents often occurring during transportation to a hospital:

AN ORDINANCE

Amending Article VI (ambulances) of Chapter 45 of the Revised Chicago Code of 1931 and providing for the equipment of ambulances with first aid and splint appliances.

Be it Ordained by the City Council of the City of Chicago:

Section 1. That article VI of chapter 45 of the Revised Chicago Code of 1931 be and the same is hereby amended by inserting, between sections 2343 and 2344 thereof, a new section to be known as section 2343-a, which new section shall read as follows:

2343-a. Attendant—splints required. No person, firm or corporation shall operate or cause to be op-

erated any ambulance, public or private, or any other vehicle commonly used for the transportation or conveyance of the sick or injured, without having such vehicle equipped with a set of simple first aid and splint appliances approved by the board of health and having in attendance at all times such vehicle is in use a person who has obtained a certificate of fitness as an ambulance attendant from the board of health.

Any person desiring a certificate as an ambulance attendant shall make application in writing therefor to the board of health. Before the issuance of any such certificate the applicant therefor must present evidence of his qualifications to fill such position and must demonstrate to the satisfaction of the board of health his ability to render emergency first aid and to apply approved splints to arm and leg fractures.

Section 2. This ordinance shall take effect and be in force from and after its passage and due publication.

The *Chicago Tribune*, in commenting on this ordinance in its issue of November 5, 1935, says:

"By bundling a traffic victim into the first available automobile and rushing him off to a hospital without adequate first aid care, the good Samaritan often does more harm than good. Serious harm is often done by the kindhearted passing motorist who picks up the victim, doubles him up to get him through the narrow door of his car, twisting the dangling broken leg or arm and increasing the peril to the unfortunate victim."

CAPROKOL OMITTED FROM N. N. R.

The Council on Pharmacy and Chemistry reports that Caprokol (Hexylresorcinol-S. & D.) was accepted for inclusion in New and Non-official Remedies, 1924. The following dosage forms were accepted by the Council: Capsules Caprokol (Hexylresorcinol-S. & D.), 0.15 Gm.; Caprokol (Hexylresorcinol-S. & D.), 2½ per cent Solution in Olive Oil; Hexylresorcinol Solution S. T. 37. When the customary three year acceptance period expired in 1931, the Council voted to reaccept Caprokol provided the manufacturers agreed to make a drastic revision in their advertising propaganda and to submit convincing evidence of the therapeutic value of the drug in all the numerous conditions in the treatment of which its use was recommended. In the course of the next two years the firm omitted a number of the most objectionable circulars and submitted evidence on the question of the analgesic action. At the time that Hexylresorcinol Solution S. T. 37 was omitted from New and Non-official Remedies because of the firm's refusal to comply with the rules of the Council, the firm requested omission of Caprokol also, stating that its continued inclusion after the exclusion of Hexylresorcinol Solution S. T. 37 might prove a source of misunderstanding with the Council. Meanwhile the firm had not submitted the new evidence required to substantiate the claims made for the product as a germicide and as a genito-urinary antiseptic. As a result of these considerations, the Council voted to omit Caprokol because the claims for its therapeutic value have not been substantiated and because the manufacturer finds it impossible to handle this substance and certain of its dosage forms separately from the unacceptable dosage form, Hexylresorcinol Solution S. T. 37. (J. A. M. A., May 25, 1935, p. 1909.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
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W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.
A. N. Collins, M. D.

What Can I Do For My County And State Medical Society?

Suggestion Number Four

1. Read the communication from Dr. B. J. Branton on the malpractice situation and Medico-Legal Advisory Committee printed in these columns.

2. Discuss your local situation and see that every member understands the new plans of this committee and also how to take advantage of the assistance offered by this new medical agency.

3. Impress upon your fellow members the fact that no new machinery for the handling of malpractice litigation difficulties will be successful without the coöperation and careful watchfulness of his conduct by each individual member.

It is thanks, largely, to the interest and careful preparatory study of Dr. Branton that the Minnesota State Medical Association is now ready to take this hopeful new step toward adjustment of its malpractice problems. The obligation of the membership to do its share in righting matters goes without saying.

Have you studied the present situation and prospects for the immediate future of care of the indigent in your county, according to last month's suggestion?

Remember that official arrangements made now for medical care of the sick poor are likely to have a permanent character.

It is the special obligation of the physician to see that the public welfare and the welfare of the medical profession are served. Write to the State Office for information or assistance if you plan to take this matter up officially with your county or township authorities.

Medico-Legal Advisory Committee Meets

One of the most important developments of the year in medico-legal matters is the appointment and prompt marshalling for action of the new Medico-Legal Committee.

This committee, originally called the Legal Defense Committee, was appointed at the direction of the House of Delegates and the Council and at the suggestion of Dr. B. J. Branton of Willmar, member of the Committee on Medical Economics.

It has already held two meetings and provided a practical plan for securing prompt information about every threat of malpractice action against a member of the association.

The plan provides for a special card to be sent out to each member with his membership card at the time he pays his dues.

This card is to be signed and returned to the committee at once in case of threatened action. The committee will then send blanks to be filled out with pertinent information and advise the member,

Malpractice Rates Increasing

Malpractice suits are increasing. Rates for protection are going up. Insurance companies will shortly refuse to write malpractice insurance at any feasible premium rate unless some action is taken to improve the malpractice situation.

Dr. Branton, who has made a thorough study of the subject, is chairman of the new committee, which includes also Dr. W. H. Hengstler of St. Paul and Dr. W. L. Burnap of Fergus Falls.

The communication by Dr. Branton printed below is of special interest and importance. It will be followed by others to be printed in future issues in these columns.

"To Guard Material Interests"

"Fitting in as an integral part in the work of the Economics Committee of our state association, the newly organized Medico-Legal Advisory Committee at its first meeting adopted certain measures of great importance to the members of the Minnesota State Medical Association.

"From Article 11 in the Association's Constitution they took the following as the basis for its existence and future work. 'To guard and foster the material interest of its members and to protect them against imposition.'

"The fact that there are more than 4,000 malpractice suits brought against doctors in the United States each year, that these suits are encouraged, many times unknowingly, by men in our own ranks in Minnesota, thereby causing a marked increase both in number of cases and size of premiums members must pay insurance companies for protection, made the committee fully cognizant of the magnitude of the problem they are facing.

"Remember, You May be Next"

"Therefore, they must ask for the full coöperation of every member in good standing that records may be filled out as requested from time to time, letters answered promptly and an unselfish reversion to the standards of 'Do unto others as you would have others do unto you' strenuously adhered to in each community. Remember, always, that unwise actions by you and destructive criticism when consulted by former patients of another, while pleasing to the patient who is looking for a chance to sue your neighbor, can revert back to you. *You may be next.*

"The card which each member will receive the first of January when he pays his dues should be kept guarded and handy. Your committee, of course, hopes you will not need to use it during 1936, but remember that they stand ready to give you the best advice obtainable when you are in need of it.

"Yours the 'ounce of prevention,' the committee's the 'pound of cure.'"

Debates—Early Returns

When the University of Minnesota debated the University of Iowa early in December on the subject—

Resolved: That the several states should enact Legislation providing for a system of complete medical service available to all citizens at public expense—

Minnesota, on the affirmative side, won.

It is heartening to know, however, that for one victory for the Affirmative there have been a half a dozen defeats among the college debating teams.

In the *large majority* of debates, here and in other states, the negative has carried off the victory.

High school debaters have been listening with interest to these debates and getting pointers from them for their own contests which will be in full swing during January and February. Winning teams will be arguing for the regional and state championships in March and April.

Helping the High Schools

There is still time to assist the high school teams. Members should not fail to look up the list printed in the December issue to see if any schools in their own communities have entered the debate.

The Minnesota Debate Handbook prepared by the Minnesota State Medical Association is off the press and can be secured at the State Office, 11 W. Summit Ave., St. Paul, together with other material that is not otherwise available to the debaters.

Printed arguments are not enough, however, and arrangements should be made in every case for friendly personal discussions with the debaters.

Society representatives will have a unique opportunity for presenting the attitude of organized medicine to the question of compulsory medical care following the public debates and pending the judges' decision. Arrangements must be made in advance.

"Credit Plans"

The question of collections always presents difficulties to the physician.

"Fly-by-night" collection agencies have traded lucratively and knavishly upon these difficulties.

It should be remembered by all physicians who are solicited by unfamiliar agencies, that the up-to-date entrepreneur no longer presents himself as a "collection agent."

He has been reading the medical magazines and he knows that new plans for extension of medical credit are in the air. He presents a "credit plan" which is going to solve all the physician's difficulties, put "low-income" patients on a long-time payment plan, put real money into the hands of the doctor and at the same time make the patient happy, independent and solvent.

The principles involved may be very good. But the proponent will bear the same investigation as the old fashioned credit agency.

When any such plan is presented to you be

sure to check up on the agency with the Corporation Department of the office of the Secretary of State at the State Capitol in St. Paul. Also write to the State Medical Association office for whatever information may be on file with the secretary of the association.

Abuse of Free Service Studied

A recent analysis of free medical service and its abuse in six out-patient clinics in Chicago yielded the following result:

Out of 1,043 cases that were completely studied, 136 or 13 per cent were found to be cases of frank abuse.

In one of the six clinics studied the rate was found to be consistently high: an average of 22 per cent of the cases treated being instances of abuse.

In others the rate was consistently much lower than 13 per cent.

The institutions with the highest standards, the best qualified medical, social service staff, the most efficient and satisfactory standards in admitting and routing patients showed the fewest cases of abuse.

Need for more thorough medical social service work to investigate home conditions, not only with reference to ability to pay, but as an aid to effective medical care, was apparent.

Need, also, for formulating principles and standards for admittance, for the number of patients to be handled and for general efficiency in handling them was emphasized.

The study was made by Dr. William Henry Walsh, director of the survey, for the Committee on Medical Economics of the Chicago Medical Society.

The committee recommended that the Society employ a special medical social service worker of its own whose duty it would be to assist the out-patient clinics in the work of selecting proper patients for free service and in the improvement of that service.

Survey Sidelight

Interesting side-light on the progress of the "Doorbell Health Survey":

Supervisors have been congratulating themselves on the high caliber of enumerators secured among "white collar workers" on the relief rolls, to make the survey.

They cited one man particularly to a group of Minnesota physicians. This man had been educated in medicine in Vienna but never licensed to practice in the United States.

Shades of all the great quack vendors!

The State Secretary promptly unearthed the fact that the wife of this unusual enumerator has already been prosecuted and sentenced for irregular practice in Minnesota.

With a list of the chronically ill such as the United States Public Health Service is now assembling, bright new worlds would surely open up for the fake cure men to conquer.

Medical Care Satisfactory For WPA Workers

Medical care for injured WPA workers is proceeding smoothly according to WPA officials.

Absence of complaints from physicians who have participated corroborates administration reports.

Up to December 1 a total of 259 vouchers for completed medical services to injured workers had been approved by state offices and sent on to Washington for payment.

Most of these were for minor injuries. A number of injuries of a major nature that were incurred before December are still under treatment and completed vouchers have not yet been sent to Washington.

Approximately 55,000 workers, Minnesota's entire quota, were under employment on WPA projects as this issue went to press. That means that the number of injured workers will increase rapidly in the next few months.

Medical men in the vicinities of WPA projects have been participating with marked fairness in this work.

Each district supervisor has a list, provided through the State Office, of physicians in the locality who are willing to engage in the work. The patient is allowed his choice from among these physicians if he has one and if it is convenient. Otherwise he is assigned to a physician by the supervisor and the work is rotated fairly among the physicians.

No Dispensaries

In Minneapolis and St. Paul each physician on the list has received some work and, in St.

Paul, the work is now going the rounds a second time.

No central dispensary is operating in either city or Duluth under the WPA. The dispensaries that treated minor injuries and also routed patients under the CWA and under SERA work relief were not re-opened under WPA management. Patients are routed direct to physicians or hospitals from the work projects.

A few physicians are still sending their bills direct to Washington and thus slowing up payment. WPA officials re-emphasize the importance of sending bills on the regular form S-69 direct to the District Supervisor's office *and sending them promptly.*

"Increasing Agitation"

From a letter sent to selected physicians by the Debaters Information Bureau, Portland, Maine:

DEBATERS INFORMATION BUREAU

Publishers of Debate Services, Programs,
Readings and "Platform News"
45a Free Street, Portland, Maine

J. Weston Walch
General Manager

Dec. 7, 1935

Dear Sir:

I don't know what you think of it, but I am sure you are tremendously interested in this increasing agitation for State Medicine.

THE ROSENWALD FUND HAS JUST APPROPRIATED A QUARTER OF A MILLION DOLLARS TO FURTHER SOCIALIZATION OF MEDICINE. THE CALIFORNIA LEGISLATIVE COMMITTEE HAS UNANIMOUSLY REPORTED IN FAVOR OF HEALTH INSURANCE; ALBERTA HAS ADOPTED IT. THIS WINTER, 100,000 BOYS AND GIRLS IN 8,000 AMERICAN HIGH SCHOOLS WILL DEBATE STATE MEDICINE BEFORE AUDIENCES TOTALLING OVER A MILLION PEOPLE!† * * * * *

†The capitals are ours.

Minnesota State Board Of Medical Examiners

List of Physicians Licensed by the Minnesota State Board of Medical Examiners on November 13, 1935

By Examination

(October Examination)

- Baggenstoss, Archie Herbert, U. of Cincinnati, M.D., 1934, Rochester, Minn.
- Behrend, Albert, U. of Pennsylvania, M.D., 1932, Rochester, Minn.
- Boettner, Roland Buell, U. of Minn., M.B., 1934; M.D., 1935, Jersey City, N. J.
- Carmichael, Francis Abbott, Jr., U. of Pennsylvania, M.D., 1934, Rochester, Minn.
- Clark, Randolph Lee, Jr., Med. Coll. of Va., M.D., 1932, Rochester, Minn.
- Cook, Malcolm MacDonell, Emory U., M.D., 1933, Minneapolis, Minn.
- Cooper, Charles Cole, U. of Minn., M.B., 1932; M.D., 1935, St. Paul, Minn.
- Famiglietti, Edward Virgil, Johns Hopkins U., M.D., 1933, Rochester, Minn.
- Fisher, Isadore, U. of Minn., M.B., 1935, Duluth, Minn.
- Ganshorn, John Alexander, U. of Manitoba, M.D., 1932, Rochester, Minn.
- Gibson, William Roland, Stanford U., M.D., 1934, Rochester, Minn.
- Ginsberg, Maurice, U. of Minn., M.B., 1935, Minneapolis, Minn.
- Goldstein, Moe, U. of Minn., M.B., 1934; M.D., 1935, Rochester, Minn.
- Good, Clarence Allen, Jr., Washington U., M.D., 1933, Rochester, Minn.
- Gurney, Charles Ernest, U. of Nebr., M.D., 1930, Rochester, Minn.
- Hamlon, John Spencer, U. of Minn., M.B., 1935, Minneapolis, Minn.
- Jackman, Raymond Joseph, U. of Iowa, M.D., 1930, Rochester, Minn.
- Johnsrud, Luverne, U. of Minn., M.B., 1935, Minneapolis, Minn.
- Juers, Arthur Louis, U. of Louisville, M.D., 1931, Minneapolis, Minn.
- Junnila, Bruno Olaf, U. of Minn., M.B., 1935, Minneapolis, Minn.
- Karlstrom, Arthur Elof, U. of Minn., M.B., 1935, Minneapolis, Minn.
- Katzberg, Louis William, U. of Nebr., M.D., 1932, Fergus Falls, Minn.
- Kemble, John William, Jefferson, M.D., 1935, Rochester, Minn.
- Kierland, Robert Richard, U. of Minn., M.B., 1932; M.D., 1933, Minneapolis, Minn.
- Layne, John Anthony, U. of Minn., M.B., 1934; M.D., 1935, Minneapolis, Minn.
- Lewis, Everett Bryan, U. of Pa., M.D., 1933, Rochester, Minn.
- Lipscomb, William Rutledge, U. of Colo., M.D., 1932, Rochester, Minn.

OBITUARY

George E. Brown

1885-1935

THE life of George Elgie Brown, of Rochester, began outside of the State of Minnesota, but his professional life began within its borders. He married in Minnesota, and after a period of absence returned to live and work here for fifteen years.

Dr. Brown was born in Grand Rapids, Michigan, in 1885. In 1909 the University of Michigan bestowed on him the degree of Doctor of Medicine and throughout the two succeeding years he served as interne in the Northern Pacific Hospital at Brainerd, Minnesota. After his marriage to Irma Parker, of Brainerd, in 1911, he settled in Miles City, Montana, where he remained in practice for ten years. In these years he was not content with mere routine but he introduced certain laboratory procedures and he brought the first fluoroscope to his part of Montana. He had been liked in medical school; in practice he became a favorite of his colleagues and of his fellow citizens. He was equally at home in a ranch house or a scientific meeting; in a mackinaw or a dinner coat. While he was still established in Miles City he spent two periods of study elsewhere: five months at Harvard in 1914 and the summer of 1916 at Johns Hopkins, where he studied organic chemistry. In 1918 and 1919 he was with the Rockefeller Foundation in France.

In 1921, Dr. Brown became first assistant in a section of the Division of Medicine of The Mayo Clinic. A position on the staff of this institution gave him even better opportunity to develop his bent toward clinical investigation and to apply scientific methods in the diagnosis and practice of medicine. His progress was rapid; he advanced to associate in medicine and to headship of a section.

Dr. Brown's contributions to medical literature began in 1911. From then onward papers and monographs were produced by him and his associates in rapid succession. Reports of approximately 150 studies bear his name. In the early years of his career these contributions ranged over a wide field of internal medicine but by 1922 his interest in the little-known field of blood vascular disease was evident. His contributions to this field in the next thirteen years were, and are, of inestimable importance. His mind was seething with projects to increase knowledge of this aspect of medicine. Fortunately for medicine and for the public, however, whatever Dr. Brown knew or suspected he imparted to his associates; therefore his work did not die with him.

As would be expected of a man of such brilliant mind and admirable social qualities, Dr. Brown was in great demand as a speaker at medical meetings. He traveled the country over, rapidly, for thousands of miles; yet he never seemed tired. Always he came back, clear-eyed, smiling, with a springy step.

Dr. Brown was short, erect, neat, blue-eyed, firm-

- Logan, George Bryan, Harvard U., M.D., 1934, Rochester, Minn.
 Lord, George Alexander, Harvard U., M.D., 1934, Rochester, Minn.
 Montgomery, Thomas Robert, U. of Ore., M.D., 1932, Rochester, Minn.
 Morlock, Carl Grismore, U. of Western Ont., M.D., 1932, Rochester, Minn.
 Muccilli, Alfred Edward, U. of Minn., M.B., 1935, Duluth, Minn.
 Mullen, Simeon Anthony, U. of Minn., M.B., 1932, Wadena, Minn.
 Nolan, Don Edwin, U. of Minn., M.B., 1935, Minneapolis, Minn.
 Olson, Stuart Arnold, U. of Minn., M.B., 1935, Minneapolis, Minn.
 Perozzi, Thelma, U. of Ore., M.D., 1933, Rochester, Minn.
 Pool, Thomas Lloyd, Northwestern, M.B., 1934; M.D., 1935, Rochester, Minn.
 Powell, William Nottingham, U. of Pennsylvania, M.D., 1931, Rochester, Minn.
 Ray, Robert Cassleman, Northwestern, M.B., 1931; M.D., 1932, Heron Lake, Minn.
 Roy, Philemon Cheverton, U. of Minn., M.B., 1935, Minneapolis, Minn.
 Sether, Arthur Fridtjof, U. of Minn., M.B., 1935, Minneapolis, Minn.
 Shapiro, Phillip, U. of Minn., M.B., 1935, Minneapolis, Minn.
 Stemsrud, Harold Lindell, U. of Minn., M.B., 1934; M.D., 1935, Pine City, Minn.
 Stevenson, Clyde Alan, U. of Wis., M.D., 1934, Rochester, Minn.
 Winer, Julius Haskell, U. of Minn., M.B., 1935, Minneapolis, Minn.
 Wolfram, Donald J., Indiana U., M.D., 1934, Rochester, Minn.
 Yeager, Charles LeVant, Coll. of Med. Evang., M.D., 1934, Rochester, Minn.

By Reciprocity

- Clement, Walter Bertram, U. of Colo., M.D., 1934, Mankato, Minn.
 Henthorne, John Charles, U. of Pittsburgh, M.D., 1931, Rochester, Minn.
 Roth, Frederick Daniel, Marquette U., M.D., 1933, Lewiston, Minn.
 Weiss, Irving Joseph, Creighton U., M.D., 1931, Big Fork, Minn.

National Board

- Ecker, Arthur David, Johns Hopkins, M.D., 1934, Rochester, Minn.
 Fritz, Wallace Lawrence, U. of Minn., M.B., 1934; M.D., 1935, St. Paul, Minn.
 Grimes, Burton Piper, U. of Minn., M.B., 1932; M.D., 1933, Minneapolis, Minn.
 Mason, James Anders, U. of Nebr., M.D., 1932, Big Falls, Minn.
 Nesselrod, Jerrold Peerman, Northwestern, M.B., 1929; M.D., 1930, Rochester, Minn.
 Tweedy, Robert Bruce, Marquette, M.D., 1935, Winona, Minn.

chinned, ruddy-faced, cheerful, tolerant, generous, frank, hospitable, a good fellow. He was, withal, brilliant, confident, a respecter but not a slave of authority, a dependable physician of seeking mind, and an excellent teacher and inspirer of others.

Elections to membership in medical organizations and other honors were bestowed on Dr. Brown. He was associate professor of medicine, The Mayo Foundation, Graduate School, University of Minnesota. He was Regent of the American College of Physicians for two terms, 1929 to 1933. He was a member of the Olmsted-Houston-Fillmore-Dodge County Medical Society, the Minnesota State Medical Association, the American Medical Association, the American Society for Clinical Investigation, the Association of American Physicians, the American Association for the Advancement of Science, the Central Interurban Clinical Club, the Central Society for Clinical Research, the Minnesota Society of Internal Medicine, the Minnesota Heart Society, the American Heart Association, Sigma Xi, Phi Rho Sigma, and the Association of Resident and Ex-Resident Physicians of The Mayo Clinic.

At the time of his death, which occurred in St. Mary's Hospital, Rochester, following an illness of two weeks, terminating in pneumonia, Dr. Brown was only fifty years of age. Mrs. Brown survives him. Also, one son, George, Jr., is a sophomore in the Medical School of the University of Michigan; the other son, Hugh, is a freshman in Carleton College.

George Everett Clark
1852-1935

DR. GEORGE E. CLARK of Stillwater died at his home August 26, 1935, at the age of eighty-three years.

George Everett Clark was born at Napoleon, Ohio, March 25, 1852. At the age of twelve he moved with his family to Adrian, Michigan, where he attended high school. He attended college at Kalamazoo, Michigan, and received his M.D. degree at Hahnemann Medical School in Chicago in 1880.

After practicing at Lima, Ohio, a few years, Dr. Clark moved to Stillwater, where he had practiced continuously until the time of his death. In January, 1891, he was appointed a member of the Minnesota State Board of Medical Examiners by Governor Merriam, a position he held until 1893, when he was appointed Professor of the Theory and Practice of Medicine at the University of Minnesota medical school.

An active member and deacon of the First Baptist Church of Stillwater, Dr. Clark served as active superintendent of the Sunday School until two years ago. He was a life member of the Baptist state convention and held various responsible positions in that organization throughout life.

Dr. Clark was a charter member of the St. Croix Lodge No. 14, A. O. U. W. In 1914 he was elected state medical examiner for the Minnesota grand lodge and in 1925 had conferred upon him the title of Past Grand Master Workman in recognition of his valued services.

Dr. Clark was married to Ella B. Bacon, December 27, 1880, at Putney, Vermont. He is survived by his widow and a cousin, Dr. G. W. Taft, president of the Northern Baptist Theological Seminary, Chicago.

E. Starr Judd
1878-1935

EDWARD STARR JUDD was one of those several sons of Minnesota who, reared where others had reached the heights of medical and surgical attainment, drew richly from his environment and then contributed abundantly in return. He was born in Rochester in



DR. JUDD

1878, the son of Mr. and Mrs. Edward F. Judd. He attended Rochester High School, and in 1902 he was graduated as Doctor of Medicine from the University of Minnesota. In 1902 and 1903 he served internship in Saint Mary's Hospital in Rochester. In 1903 and 1904 he was first assistant to Dr. Charles H. Mayo and in the latter year he became head of a section in the Division of Surgery in The Mayo Clinic. In 1915 he was

appointed Associate Professor and in 1920, when he was forty-two years of age, Professor of Surgery, The Mayo Foundation, Graduate School, University of Minnesota. At the time of his death he was Chief of the Surgical Staff of The Mayo Clinic. His fame as a surgeon extended throughout the civilized world.

Although his training and experience qualified him for the broad designation of general surgeon, in his latter years Dr. Judd was engaged more in abdominal surgery than in other fields. Throughout the last two years of his life he devoted less of his time to operative surgery, more to consultation, and more to teaching, whereby he had prepared younger surgeons to take over his work. He had planned, during the coming year, to join Drs. W. J. and C. H. Mayo in their full time application to consultation and instruction.

In 1908, he first contributed to medical literature; his subject was inguinal hernia. From that time onward he was a constant writer on surgical subjects. In the early years his titles covered a wide range, such as cancer of the lip; skin grafting; operations for goiter, for diseases of the breast, and for conditions of the gallbladder; surgery of the urinary bladder and surgery of the kidney. After 1925, the bulk of Dr. Judd's contributions had to do with surgical disease of the stomach, intestine, liver, biliary tract, and pancreas. In all, about 325 articles under his name have been published.

Dr. Judd was in great demand as a speaker at medical meetings and many honors were bestowed on him. Throughout his life he was indefatigable in the work

of organized medicine, and in 1923 he was President of the Minnesota State Medical Association; in 1931 and 1932, long years of endeavor in the councils of the American Medical Association, culminated in his being elected its President. In 1932 he was President of the Society of Clinical Surgery, and in 1934 the University of Maryland admitted him to the degree of Doctor of Science. He was an honorary member of the Urologic Society of Brazil and a correspondent of the Royal Academy of Medicine of Rome. Dr. Judd was a member, also, of the Olmsted-Houston-Fillmore-Dodge County Medical Society, the Minnesota Pathological Society, the Minnesota Academy of Medicine, the Southern Minnesota Medical Association, the Interurban Surgical Association, the Southern Surgical Association and the Western Surgical Association. He was a member of the American Surgical Association, a Fellow of the American College of Surgeons, a fellow of the Seattle Surgical Society and an honorary fellow of the Philadelphia Academy of Surgery. In addition, he was a member of Alpha Kappa Kappa, of Sigma Xi, and of the Association of Resident and Ex-Resident Physicians of The Mayo Clinic.

Through the period of participation of the United States in the World War, Dr. Judd was Major, Medical Officers' Reserve Corps, and Director of the School of Instruction for officers of the Medical Corps and for enlisted men of the Medical Department of the Army, in Rochester. Thereafter he gave much time to training of medical reserve officers.

In person, Dr. Judd was a small man of might. He was noticeably erect, of stocky build, and a short neck bore a somewhat massive head. He moved briskly and purposefully. Just as there were no loose joints in his compact body there seemed to be no loose ends in his well ordered life. He did a tremendous amount of work without lost motion or lost words; yet he was not taciturn. He would talk freely enough, very much to the point, when he had anything to say. A somewhat impassive, extremely firm, but predominantly kindly face, with quiet, direct, clear gray eyes lay beneath a full brow. Here, the observer would say, is an imperturbable, energetic, effective, intelligent, practical, trustworthy man, who although of kindly disposition, is capable of impenitence and of delivering rebuke if need be.

In 1908, Dr. Judd married Helen Berkman, of Rochester, the daughter of Dr. and Mrs. David Berkman. Of the five children, Eleanor, Mrs. O. L. Kirklín, lives in Rochester; Edward S., Jr., is a student in Rush Medical College; David is a student in the University of Minnesota Medical School, and Helen Phoebe and Mary Jane are attending Sweet Briar College in Virginia.

Dr. Judd left Rochester shortly before Thanksgiving Day, to address a meeting in Philadelphia, to see his daughters Helen and Mary Jane, and to attend the Army-Navy football game, for he had an abiding interest in athletics. He had a cold before his departure, but he did not consider it serious. He became definitely ill while passing through Chicago, where, in Presbyterian Hospital, he died of pneumonia on November 29.

Patrick Albert Smith

1866-1935

DR. P. A. SMITH was born in Nation Mills, Quebec, Canada, July 27, 1866, and died November 27, 1935, at the age of sixty-nine at Faribault.

Dr. Smith obtained his education in the Canadian public schools and graduated from Ottawa University in 1884 and from the Jefferson Medical College in 1893. In 1910 he took a postgraduate course in Vienna, Paris and London.

For several years Dr. Smith served as county coroner, resigning that position to become county commissioner. He was chairman of the county commissioners at the time of his death. Dr. Smith's tireless devotion was responsible for the erection of the new court house at Faribault, which is regarded as the finest in the state.

Dr. Smith served as county physician for a number of years and represented the county on the Cannon Falls Sanatorium board. At one time he acted as a member of the Advisory Commission of the Minnesota State Board of Control. He was a member of the Rice County Medical Society, State Medical Association and American Medical Association, the Lions Club, Order of Foresters, and the B.P.O.E.

In 1892 Dr. Smith married Lilas H. Brady of Montreal, Canada. Four children were born of this union. Mrs. Smith died in 1916 and in 1922 Dr. Smith married Loretta Lieb, who died the same year. He is survived by three sons, Ewart, Ardath and Verrill, and one daughter, Lilas.

Laurence F. V. Sutton

1879-1935

DR. L. F. V. SUTTON of Mazeppa, Minnesota, died very suddenly of a heart attack on retiring, December 4, 1935.

Laurence F. V. Sutton was born in Zanesville, Ohio, January 22, 1879, and received his common school education in Zanesville and Columbus. He studied at the University of Maryland and received his M.D. degree at the University College of Physicians and Surgeons at Baltimore in 1906.

Dr. Sutton began practice in Zanesville, Ohio, in 1906, but soon moved to Chicago, where he practiced from 1906 to 1916. He then became physician in charge at the Buena Vista Sanatorium at Wabasha, Minnesota. Later he located in Saint Paul and in 1917 he joined the Ramsey County Medical Society, but transferred his membership to the Wabasha County Medical Society in 1921, when he moved from Saint Paul to Mazeppa. In 1929 he again transferred his membership to the Olmsted County Medical Society, this society meeting in closer proximity to his location.

Dr. Sutton was local health officer at Mazeppa for many years. He was a member of the Masonic order as well as of county and state medical societies and the American Medical Association. Besides his widow he leaves a son, Carol, and a daughter, Marian. A man

of wide general culture and a skillful physician, Dr. Sutton will be greatly missed in the life of Mazeppa.

William P. Thelen
1876-1935

DR. WILLIAM P. THELEN died at the home of his brother, A. C. Thelen, near Washburn, Wisconsin, July 17, 1935, having been in ill health for a number of years.

William P. Thelen was born in 1876 on the Thelen farm near Houlton. He attended school at Stillwater and graduated from high school in 1897. He received his medical degree from the University of Minnesota and began practice at Carpio, North Dakota, later moving to Wilton, North Dakota, where he enjoyed an extensive practice.

For the past five years Dr. Thelen had spent his winters in Florida and his summers on the farm home-
stead near Houlton.

Dr. Thelen is survived by his widow (nee Mattie Bigler), a daughter, Mrs. Gretchen T. Newell of Chattanooga, Tennessee; one sister, Lucy Thelen of St. Joseph township; three brothers, Judge Edward Thelen of Stillwater, John Thelen of Great Falls, Montana, and A. C. Thelen of Washburn, Wisconsin.

**Dinitrophenol Not Acceptable
For N. N. R.**

The Council on Pharmacy and Chemistry reports that, despite the warnings of investigators and a report issued by the Council, dinitrophenol has been used extensively in the treatment of obesity and not always with the necessary precautions. About twenty commercial concerns are furnishing dinitrophenol or mixtures in which this drug is the active principle. Some smaller concerns have sent samples of the drug unsolicited to physicians and in the accompanying literature have minimized the dangers of its use. It is not surprising, therefore, that undesirable and even serious toxic manifestations of the drug have been reported. Up to the present time six deaths following the administration of dinitrophenol have been reported. In most of the patients, death occurred within twenty-four hours of the onset of toxic symptoms such as dizziness, dyspnea, fatigue, pyrexia and excessive perspiration. The Journal has repeatedly indicated that the sale of dinitrophenol should be restricted to physicians' prescriptions and that the widespread use of the drug in the treatment of obesity should await further study in laboratories and clinics. The use of the drug should be limited to carefully selected cases. Patients with diabetes, nephritis and diseases of the liver and heart should not be given the drug. The Council has suggested that restrictions be placed on the sale of dinitrophenol and reducing mixtures containing dinitrophenol in this country and that the use of the drug be restricted to selected patients under the observation of properly trained physicians. The use of dinitrophenol by all others should await further careful experimentation in the laboratory. The Council voted that dinitrophenol and brands of dinitrophenol be not accepted for inclusion in New and Non-official Remedies and authorized publication of this report explaining its position in the matter. As the Council's report was going to press, reports were received of patients afflicted with cataract following the use of dinitrophenol. (J. A. M. A., July 6, 1935, p. 31.)

**REPORTS AND ANNOUNCEMENTS
OF SOCIETIES**

Medical Broadcast for January

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 10:00 A. M. every Monday over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

- January 6—Fever Treatment.
- January 13—Hysterical Paralysis.
- January 20—Bronchiectasis.
- January 27—Pyorrhea and Gingivitis.

The American College of Physicians

The twentieth annual session of the American College of Physicians will be held in Detroit with headquarters at the Book-Cadillac Hotel, March 2 to 6, 1936.

Dr. James Alex. Miller, of New York City, is president of the College, and has arranged a program of general scientific sessions of great interest to those engaged in the practice of Internal Medicine and associated specialties. Dr. Charles G. Jennings, of Detroit, is the general chairman of the session, and is in charge of the program of clinics and demonstrations in the hospitals, medical schools and other Detroit institutions. Dr. James D. Bruce, vice president in charge of university relations, University of Michigan, is vice chairman of the Committee on Arrangements, and has in charge the preparation of an all-day program to be conducted at the University of Michigan on Wednesday, March 4. Dr. Walter B. Cannon, Professor of Physiology at Harvard University Medical School, will deliver the annual convocation oration on "The Rôle of Emotion in Disease." Dr. Miller's presidential address will be on "The Changing Order in Medicine." About fifty eminent authorities will present papers at the general scientific sessions, while clinics and demonstrations will be conducted at the Harper, Receiving, Ford, Grace, Herman Kiefer and Children's Hospitals, of Detroit.

State Meeting

Plans for the 1936 meeting of the Minnesota State Medical Association took final shape at the second session of the Committee on Scientific Assembly held Saturday, December 14, in Saint Paul.

The state meeting will be held in Rochester, Monday, Tuesday and Wednesday, May 4, 5 and 6, at St. Mary's Hospital and Nurses' Home, with Council and House of Delegates meetings on Sunday, May 3.

By way of novelty, the demonstrations which have

been a feature of the past four meetings will give way, this year, to clinics. These clinics will be held each morning from 8:30 to 10:30 at St. Mary's Hospital by members of the Mayo Clinic Staff.

Addresses by out-of-state guest speakers will finish the morning sessions each day with a half hour reserved both morning and afternoon for viewing the exhibits.

The afternoon sessions, with the exception of the exhibit period, will be devoted to papers by Minnesota men.

A medical question court similar to those of the last two years will serve as a finale to the meeting Wednesday afternoon. This year, however, the questions will probably be confined to two or three selected subjects.

Two large evening meetings are planned, also, for Monday and Tuesday, May 4 and 5. The Monday evening meeting will be devoted to Medical Economics according to present plans. Dr. Olin West, manager of the American Medical Association, will be one of the speakers, also Mrs. J. W. Robb of Detroit.

A non-medical celebrity will be asked to address the Tuesday evening meeting if present plans go forward.

Technical exhibit space for this meeting is now at a premium, practically all spaces in the regular exhibit hall having been sold early in December. Additional spaces will be opened for a limited number of additional exhibitors in the corridors and in the East Hall of the Nurses' Home.

East Central Minnesota Society

The East Central Minnesota Medical Society held its annual meeting recently and elected the following officers: Dr. H. T. Norrgard, Milaca, president; Dr. Melvin Vik, Onamia, vice president; Dr. Elmer H. Hansen, Princeton, secretary-treasurer; Dr. C. G. Kelsey, Hinckley, delegate; Dr. H. C. Cooney, Princeton, alternate.

Dr. Everett C. Hartley of St. Paul talked at this meeting on "Clinical Observations on the Use of Endocrines in Obstetrics and Gynecology." Dr. Everett K. Geer of St. Paul talked on "Diagnosis and Treatment of Asthma" and Dr. R. G. Allison of Minneapolis on "Recent Developments in the Treatment of Malignancy by Deep X-ray Therapy."

Minnesota Radiological Society

The Minnesota Radiological Society held its winter meeting at the Nicollet Hotel in Minneapolis, Saturday, December 14th. The following program was presented:

Radiation Therapy of Carcinoma of the Lip—A. L. Abraham and W. K. Stenstrom, Minneapolis.

Roentgen Study of the Results of Epiphyseal Injuries—Oscar Lipschultz, Minneapolis.

The Dangers of Reducing Fractures Under the Fluoroscope—E. T. Leddy and C. A. Stevenson, Rochester.

Demonstration of Some Bone Changes in Children—M. J. Shapiro, Minneapolis.

Roentgen Study of Spontaneous Internal Biliary Fistula—C. N. Borman, Minneapolis.

Experiences with Roentgen Therapy of More Than 3000 R in One Month—W. K. Stenstrom and Lewis Jacobs, Minneapolis.

Combined Heat and Roentgen Therapy of Tumors—Review of the work of Stafford Warren and Associates—C. O. Hansen, Minot, N. D.

The next meeting of the Society will be held in St. Paul in March.

Minneapolis Surgical Society

January 9, 1936

Recreation Room, Nurses' Hall, University of Minnesota

9:30-11:30 A. M.

(Papers read to be limited to *ten minutes* only.)

DR. N. LOGAN LEVEN: Carcinoma of the esophagus
DR. HERBERT A. CARLSON: Surgical treatment of lung abscess

DR. DONALD CREEVY: Renal calculi

DR. MELVILLE H. MANSON: The Callander operation for amputation of the thigh

DR. OWEN H. WANGENSTEEN: The management of cases with imperforate anus

DR. LOUIS SPEILING: The rôle of the ileo-cecal sphincter in large bowel obstruction

DR. WILLIAM T. PEYTON: Some experiences with mixed tumors of the palate and pharynx

DR. HARRY P. RITCHIE: Ten minutes of lantern slides of the face

11:45-1:15

Luncheon

University Hospital Staff Meeting

Dr. William A. O'Brien presiding

Subject for discussion: Empyema

1:30-5:00 P. M.

Operations by University Hospital Surgical Staff
Main operating room, fifth floor

8:00 P. M.

Regular meeting—20th floor, Medical Arts Building
DR. WILLIAM T. PEYTON: Report on brain tumor operations done at the University Hospital during the years 1935

DR. RALPH T. KNIGHT: Report from the Congress on Anesthesia

DR. OWEN H. WANGENSTEEN: The high gastric resection in cancer of the stomach with relation of personal experiences

All physicians are cordially invited to these meetings.

February 6, 1936

The Minneapolis Surgical Society will hold their 14th Annual Foundation Dinner on the evening of February 6, 1936, at the Minneapolis Club. Dr. Frank H. Lahey of Boston will give the oration in Surgery. Representatives from the Chicago, Rochester, Duluth and Saint Paul surgical groups will be present and bring the greetings of these organizations.

Mower County Society

Mower County Medical Society held its annual meeting at the Hotel Austin in Austin, November 27. The following officers were elected: Dr. J. K. McKenna, Austin, president; Dr. J. M. Thompson, Brownsdale, vice president; Dr. P. A. Robertson, Austin, secretary, and Dr. A. E. Henslin, LeRoy, treasurer.

Range Medical Society

The monthly meeting of the Range Medical Society was held November 21, 1935, at Virginia. Drs. J. R. Manley and Philip Bray of Duluth spoke on the subject of Obstetrics. Dr. B. S. Adams of Hibbing gave a report of the recent meeting of the American College of Surgeons. Dr. S. S. Blacklock gave a short eulogy of the late Dr. Bullen of Hibbing.

Red River Valley Society

The following officers of the Red River Valley Medical Society were elected at the annual meeting of the society held on the evening of December 10, 1935, at Crookston, Minnesota: President, A. R. Reff, Crookston; vice president, J. L. Delmore, Roseau; secretary-treasurer, C. W. Froats, Thief River Falls; delegates, O. E. Locken, Crookston, and C. M. Adkins, Thief River Falls; censor for three years, A. M. Smith, Thief River Falls.

Washington County Society

At the annual meeting of the Washington County Medical Society the following officers were elected: Dr. George F. Brooks, Stillwater, president; Dr. V. C. Thompson, Marine, first vice president; Dr. Robert P. Ewald, Newport, second vice president; Dr. E. S. Boleyn, Stillwater, secretary-treasurer. Dr. Boleyn was elected State Delegate and Dr. Wade R. Humphrey, alternate. The censor for 1936-1939 is Dr. J. W. Stuhr.

Dr. Clarence N. Bulkley of Stillwater was elected to associate membership. Dr. Bulkley graduated from the University of Minnesota medical school in 1932.

A representative of the Woman's Auxiliary of Washington County Society reported the desire of the Auxiliary to coöperate with the county society, especially in connection with the sale of Christmas seals and high school debates on state medicine.

*If you have not paid
for your Christmas seals,
won't you do so now?
Your help is needed.*

WOMAN'S AUXILIARY

MRS. F. J. ELIAS, *President*, Duluth, Minn.
MRS. L. W. BARRY, *Editor, Press and Publicity*,
2193 Sargent Ave., St. Paul, Minn.

Hennepin County.—Completion of twenty-five years of organization of the Women's Auxiliary to the Hennepin County Medical Society was celebrated by a Silver Jubilee on December 6 in the Medical Library of the Medical Arts Building in Minneapolis. Twenty-five years ago a small group of wives of medical men, under the leadership of Mrs. W. M. Byrnes, conceived the idea of a medical auxiliary which would function as a social and philanthropic organization, the first of its kind in the United States. Today the group has a membership of 350 women, who, headed by Mrs. G. T. Nordin, are a very active and enthusiastic society. Mrs. J. M. Hall was in charge of the arrangements for the celebration.

The Women's Auxiliary to the Hennepin County Tuberculosis Association recently sponsored the sale of handwork of patients of Glen Lake Sanatorium. The entire proceeds of the sale, over \$800, were turned over to the patients who made the articles.

Ramsey County.—The Auxiliary to the Ramsey County Medical Society reports that it exceeded its quota by 80 per cent in securing Red Cross memberships. Mrs. F. J. Plondke was in charge of this work.

The Ways and Means Committee, under the leadership of Mrs. Herman Kesting, arranged a very enjoyable and profitable Baked Ham dinner on December 11 in the Medical Rooms in the Lowry Building, Saint Paul. Dr. E. M. Hammes acted as toastmaster. A delightful program arranged by Mrs. K. C. Wold was enjoyed by over 200 guests. The proceeds from the dinner will be placed in the Emeritus Fund.

DERMAL ABSORPTION OF VITAMIN D

Several years ago, experiments on rabbits and rats were reported suggesting that Vitamin D was absorbed through the skin. Irradiated impure cholesterol suspended in cottonseed oil and applied to the depilated skin on the backs of the experimental animals completely protected them from rickets. Recently similar results have been obtained in rats administered viosterol by inunction. One investigator has observed that the application of viosterol in either a liquid petrolatum or a wax base to the tail alone permitted the absorption of sufficient amounts of the antirachitic factor to prevent the development of rickets. Further confirmatory evidence has been obtained on rats fed a standard rachitogenic diet and given inunctions of viosterol in an ointment base on areas of skin from which the hair had been removed by a sulphide depilatory. Both roentgenograms and "line tests" showed that the animals thus treated were completely protected from rickets, whereas controls receiving inunctions of irradiated liquid petrolatum developed the condition. The practical value of this method of administering Vitamin D remains to be determined. It may prove useful in infants and in subjects lacking the ability to utilize lipids administered orally. (J. A. M. A., July 6, 1935, p. 36.)

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of November 13, 1935

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, November 13, 1935. The President, Dr. A. R. Hall, called the meeting to order at 8 p. m. There were sixty members and one visitor present.

Minutes of the October meeting were read and approved.

Upon ballot the following men were elected as candidates for membership: Dr. W. L. Benedict, Rochester, to Associate membership; Dr. L. M. Daniel, Minneapolis, to Active membership; and Dr. Robert G. Green, Minneapolis, to University membership.

The scientific program followed.

RADIATION THERAPY

R. G. ALLISON, M.D.
Minneapolis

Dr. Allison read his Inaugural Thesis on the above subject and showed lantern slides. (To be published in full in MINNESOTA MEDICINE.)

Abstract

The history of radiation therapy was reviewed from the time of Roentgen's discovery of the ray up to the present time. The gradual evolution of the different measuring instruments was described. The development of the interrupterless transformer and the hot cathode tube was described. The combined radium-x-ray therapy was described. Comparative values of radiation at 200 kilovolts and 400 kilovolts and radium therapy were cited. The sensitivity of different types of tumors to radiation was discussed.

Discussion

DR. R. T. LA VAKE (Minneapolis): Last year we had two cases of advanced carcinoma of the cervix and corpus uteri. One of these women in November of the year before came in with slight bleeding ten years after the menopause. She was told she must have a diagnostic curettage but she was going to Florida and said she would have it done there if necessary. After going to Florida she bled a little and the physician did not do a diagnostic curettage but gave her deep x-ray therapy (I do not know the strength) and she stopped bleeding. She came back in May and was apparently normal. About September she was brought in with a huge tumor that came up to the umbilicus. It gave the impression of being an ovarian cyst. A preliminary diagnostic curettage was performed. On going through a small senile cervix, a quart of bloody fluid came from the uterus and when the cervix was dilated a carcinoma was found which extended from the fundus of the uterus to and involving the cervix. It looked absolutely hopeless. Knowing that Dr. Schmitz had this 800 kilovolt machine, we sent her down to Chicago. That was last November, and when I examined her two weeks ago I could not feel the least bit of pathology. Apparently she is cured. Time alone will tell.

The other woman presented in extremis, but we de-

cided to try the 800 kilovolt machine. So she was sent to Dr. Schmitz. She was almost moribund and we did not know whether she would live to get there. She had two courses of treatment and was well for about five months. Then she developed metastases and died in four months.

SCHLATTER'S DISEASE

L. C. BACON, M.D.
Saint Paul

The treatment of three cases of Schlatter's disease or, as sometimes designated, Schlatter's syndrome during a period of one year, has caused me to view the difficulty with interest and to come to the conclusion that it is not as rare as the meager mention in textbooks would lead one to believe. In a rather extensive search of the surgical works in the English language, I find that reference to the condition is contained in a short paragraph or two or it is not mentioned. One surgeon of prominence devotes a short paragraph to the condition and states that he has seen such a case.

It is a difficulty of the adolescent period of life and in our cases occurred in high school athletes. The inference is that it may occur in the adolescent whenever the individual is subjected to a sudden and unprepared-for strain, especially in contests. Since seeing these cases I have taken the opportunity, when possible, to examine the tuberosity of the tibiae in those with a history of youthful athletics and have been interested by the number who show an unusual prominence of the tuberosities. It seems probable that Schlatter's disease is more frequent than is supposed and that it is often overlooked.

Our cases gave a history of a sharp pain below the knee occurring during violent exercise, followed by continued pain and an inability to hold the leg stiff and to control the knee when standing. Grasping the tuberosities firmly between the thumb and fingers, they have been distinctly movable.

I have searched out the original discussion of the condition by Dr. Carl Schlatter, of Zurich, published in 1903, but have been unable to find a translation into English and it seems fitting that a translation should be here given. For this translation, I am indebted to the kindness of Dr. John J. Hochfilzer, of St. Paul. The discursive part of the original article follows, leaving out only the report of some eight cases.

(Translation)

Injuries of the Beak-like Process of the Upper Tibiæ Epiphyses

DR. CARL SCHLATTER

"There is a typical form of a not very rare knee injury, but its clinical entity has not been fully described so far, in spite of the remarkable progress made in clinical diagnosis in the modern age. At least I

was unable to find any references in the medical literature.

"In such injuries a piece of bone is chipped off from the process of the upper tibial epiphysis, which embraces anteriorly, beak-like, the caput tibiae.

"Among our large clinical material we see from time to time young patients who complain about pains in the knee region which they believe might have been caused quite some time ago either by trauma or spontaneously; physical findings in such cases are usually essentially negative except a tenderness over the tuberosities of the tibiae; and so many times a wrong diagnosis has been made, calling this condition incipient tuberculosis of the tibial epiphysis or an inflammation of the infrapatellar bursa if a slight swelling in the region of the ligamentum patellae accompanies the tenderness; but such a diagnosis becomes very doubtful after the patient has fully recovered in spite of no, or very irrational, treatment instituted for such conditions. Seven cases of this kind came under my observation in the last two or three years which were for a long time sailing under a wrong diagnosis. I succeeded finally in making a correct diagnosis in these cases. It was made possible through the cooperation of the x-ray institute of the Kanton Hospital in Zurich, whose chief is Dr. Zuppinger.

"The following up and study of these cases has finally convinced me that we are dealing with a very characteristic clinical entity and its symptoms can be interpreted quite easily even without x-ray pictures. (Then follows the report of eight cases.)

"First of all a few anatomical remarks which may illuminate the occurrence and etiology of these injuries. For the understanding of such cases it is of paramount importance to have an exact knowledge of the nature and development of the upper tibial epiphysis.

"The best textbooks of anatomy describe this condition very insufficiently and mostly in small print. It is said that, in adolescence, a tongue-like process develops at the proximal epiphysis from where the tuberosities of the tibiae come off, but nothing is said about the very important question, in what year of development does this process appear and when does it disappear, that is, when does it unite with the diaphysis; also whether it originates from the epiphyseal plate or from a separate bone nucleus, or, in other words, whether it grows from above downward, or vice versa? According to Langer-Toldt, the development of the epiphyseal process occurs in the period from the eleventh to the thirteenth year, and disappears in the nineteenth year of life. According to Merkel-Heub, the unification between the epiphysis and the bone shaft takes place between the eighteenth and twenty-fifth years of life. Wilms and Sick studied the development of the bones on hand of numerous x-ray pictures from birth to full growth. They found, in the thirteenth year of age, the appearance of a beak-like process at the upper tibial epiphysis which later forms the tuberosity of the tibia. According to their observations the epiphysis united with the diaphysis in the twentieth year of age. Ludloff has lately written about the architecture of the lower epiphysis of the femur and upper end of the tibia. He states that a new seam of the epiphysis appears in the twelfth year of life, which branches off from the cross seam of the tibial epiphysis. In the seventh and eighth years of life this incipient stage of bone formation is hardly noticeable, but from then on it grows rapidly to a noticeable tuberosity in the fifteenth year of age and can not be distinguished from the diaphysis at the end of the eighteenth year of age.

"These classifications are of great importance in keeping before us the possibility of the occurrence of these injuries. I tried to substantiate the accuracy of these statements on a large amount of material at the institute of anatomy at Zurich. These investigations

proved that the time of the appearance and disappearance of the epiphyseal process is very variable. In one case a fully developed process could be made out at the age of twelve; in another it could not be detected at the age of fifteen. It further proved that the unification of epiphysis and diaphysis may take place in some cases as early as the age of fourteen, while the usual time is between the eighteenth and twentieth years. From our x-ray pictures we formed the impression that not only general development and constitution, but also the race of the individual had a great influence on the growth of the epiphysis. For instance, we find an earlier differentiation of the epiphysis in the Roman race than in the Germanic.

"On close observation of our anatomical material and x-ray pictures we find, without exception, a bone nucleus at the distal point of the tongue-like process; this nucleus always has some connection with the process either through porous fragile bone substance or a small cartilaginous bridge, according to the age of the individual. Therefore, it is our belief that in the great majority of cases the epiphyseal process arises from the bone nucleus of the tuberosity of the tibia by a growing together of the nucleus and the epiphyseal plate. This point of conjunction leaves an area of diminished resistance where even slight injuries may cause a separation of the continuity. There we have, in the earlier years of life, a thin cartilaginous and later a fragile spongy bone (Spange) in the same area that the ligamentum patella is inserted and it is easily conceivable that, besides direct fractures, indirect fractures may occur through a forceful contraction of the quadriceps muscle. It is peculiar that in many cases of our material the patient denied any kind of trauma though the x-ray pictures gave definite proof of an injury to the epiphyseal process.

"A survey of our material relative to the pathological anatomical changes brings out the fact that the point of the epiphyseal process where the bone nucleus is located is usually the seat of the injury. We find this portion either in a state of dislocation or, later on, thickened by the formation of callus. During the developing stage of the process only its points seems to be subjected to injuries because the weak cartilaginous bridge is unable to transfer the force. In one macerated bone of a juvenile individual, I saw the formation of a fracture line just because of the process of maceration, but in the later stage of development, where the epiphyseal process is already united with the diaphysis, a dislocation of the whole beak-like process may take place. The ages of our patients were between the twelfth and seventeenth years. Individuals between thirteen and fourteen years of age seem to be especially disposed to this injury.

"Very peculiar was our observation that all cases were males and that the injury occurred seven times on the right knee and only once in the left. The reason for the rare occurrence among females may be the difference in their occupations and the less strenuous use of their muscles. I do not believe the fact that the right knee is so often involved is just accidental. There are certain reasons for this predisposition of the right side. Daily experience shows us that the right leg is much more used than the left, and therefore the musculature of the right extremity is better developed than the left one. The right extremity is therefore more often exposed to various insults and its strong quadriceps muscle may easily cause a tear of the ligamentum patella from its insertion and so lead to an indirect fracture.

"Now in regard to the symptoms of these injuries. The subjective symptoms have something very characteristic. We are usually dealing with male patients in the period from the twelfth to the twentieth years, but especially in the thirteenth and fourteenth years of age. Going into their history we find that their symptoms, chiefly pain in the knee region, were caused either by

a direct fall on the knee or by a forceful pull of the quadriceps muscle. These pains may be very light in the beginning so that the patient may have forgotten what caused them. In uncomplicated injuries of this kind the functional disturbances are very slight, and maximum flexion and extension are possible. Only in cases where the extremities are used a great deal the pains may exacerbate. Frequent recurrences of these increased pains may finally bring the patient to the physician although the injury may have occurred many months in the past.

"Among the objective symptoms, the most characteristic is tenderness on pressure over the epiphyseal process. The typical tender spot lies over the tuberosity of the tibia about two and a half centimeters below the knee joint. The region of tenderness can be covered with the end of your thumb. Besides this tenderness, one usually finds, on the same spot, a bony protuberance. If the patients are examined in the later stage of their morbidity, these two symptoms only are markedly pronounced. If the injury is a recent one, one finds also a swelling of doughy consistency in the patellar region. The knee joint itself is usually free from symptoms if the injury is uncomplicated and so extra-capsular. Another symptom which should be mentioned is the muscular atrophy, especially of the quadriceps muscle, because of the inactivity of the lower extremity.

"The prognosis of this condition is favorable. We are dealing with an affection which is part of a physiological development of the bone, and which disappears as soon as a bony union between epiphysis and diaphysis has taken place. Therefore time itself may bring complete recovery without any medical intervention. The closer the patient is to the end of the developing period, the sooner will the morbidity cease; therefore the prognosis is more favorable in older individuals than in younger ones. Involvement of the knee joint has a great influence in determining the time of recovery.

"Of great importance is an early rational treatment. These cases without treatment suffer pains over a period of a year or more, while the treated cases were much sooner relieved of their pains, some even after a few weeks. In spite of the long period of morbidity, no permanent disability results from it. Sometimes the formation of marked callus at the tuberosity of the tibia may develop, which hinders long kneeling on the knee. The principle of a rational treatment for these cases is immobilization of the knee joint. If the injury is of slight degree application of an immobilizing bandage is sufficient. Severe cases demand rest in bed that will also help to prevent further action of the quadriceps muscle on the plane of fracture. Starch bandages are better than splints. It is advisable to start with massage of the quadriceps muscle quite early to prevent an otherwise inevitable muscular atrophy."

This ends the translation of Dr. Schlatter's article, and the most that can be said about these cases has been discussed therein; but in our cases we noted a few variations.

In all three of our cases the tuberosities of both tibiae were fractured. In all three cases the onset of the difficulty was marked by a sharp pain followed by continuous pain and inability to control the knees. The patients said the knees became weak at once and continued weak. The trouble began during strenuous exercise and had existed only a few days when we were consulted. The pain and swelling were confined to the area of the tuberosities and these were prominent

and distinctly movable when firmly grasped between the thumb and finger.

The first case was in a large and finely developed boy, aged fifteen years, who played center on one of our high school football teams. The pain and disability came on during a scrimmage. He had completely lost the ability to extend the legs and to control them when standing. As you can see in the x-ray negative, the insertion of the patellar tendons with a portion of the tuberosities had been torn away and a dislocation of the remainder of the tuberosities had occurred.

The second case was that of a fifteen year old boy whose specialty was pole vaulting. The detachment was not as complete as in the first case, but was of the lower portion of the tuberosities with fracture through the process, and the disability was not as great as in the first case.

The third case was that of a ten year old girl given to doing cart-wheels. Both tuberosities were displaced and the general symptoms were the same as in the other cases. This case showed exceptions to several of Schlatter's observations, namely, a girl and younger in age. The fact that she was athletic makes it probable that the difficulty may occur in either sex if the properly directed strain occurs. As you will see in the negatives, the rupture is marked in the first view; in the second, taken after four weeks, the position is good and the line of cleavage is still apparent. The third plate, taken nearly a year later, shows the final results. The left still shows the line of cleavage with some bone formation making a firm union. The right seems to be united by bony formation. The child has just reached her eleventh year.

We saw all of these cases within a few days of the accidents and the symptoms were acute and apparent. Rest, posterior splints and strapping with adhesive, corrected the symptoms in a few weeks, with a restoration of function. In all cases the tuberosities remained prominent.

Discussion

Dr. A. R. COLVIN (St. Paul): The changing opinion relative to the etiology of bone disease is interesting to follow. It is but a short time since there was a great deal of speculation as to the origin of von Recklinghausen's disease or generalized osteitis fibrosa; and then out of the researches on parathyroid disorder and calcium regulation comes the recognition of the relationship of parathyroid tumors to hyperparathyroidism and the relation of this to decalcification of bones and to osteitis fibrosa. Removal of the parathyroid tumor results in complete calcification of the bones again.

In 1903 Schlatter described a traumatic separating of the epiphysis of the tibial tubercle. Osgood described it in 1904, and in 1906 Schlatter again described partial separation of the tubercle. In 1917 and since there seems to be a tendency to include Osgood-Schlatter's disease in the same category as Perthes, Calve, Legg disease of the hip in the young and it is now designated as Osteochondritis Deformans Juvenilis. This disease process seems to begin in the bone underlying the epiphyseal cartilage with a resulting separation of the epiphysis due to trauma or not, for there often is no history of trauma. Osteochondritis dissecans used to be ascribed to trauma, and here again we have an

underlying circumscribed osteitis with resulting fracture of the cartilage and the letting free of a loose body in the joint.

The two slides I have are shown to indicate the importance of differential diagnosis in the region of the tibial tubercle. The first slide shows a localized granulating osteitis in the region underlying the tubercle; from the granulation tissue cultures of staphylococci were found. In the slide it looks as if the tubercle had been separated.

In the next slide, a small area about the size of a grain of wheat is seen on the superficial surface of the tubercle from which again cultures of staphylococci were made. These slides are shown, not to connect them with Schlatter's disease, but to call attention to the diagnostic possibilities. Perthes, Calve, Legg disease, Schlatter's disease, Kohler's disease, are also spoken of as an osteochondritic dystrophy.

DR. ARNOLD SCHWYZER (St. Paul): This paper brings back memories of student days. Schlatter and I were students together and were for a short time together as assistants of Kroenlein in Zurich. Schlatter, in Kroenlein's absence, made the first successful total gastrectomy. When he later came out with his observations on what he termed avulsion of the tuberculum tibiae he considered the condition due exclusively to trauma. However, right from the start this explanation did not satisfy others. Roentgenologists showed that what he had taken for an avulsion of the tubercle could be seen rather regularly in adolescents, particularly in late rickets. It was then shown that quite often trauma had not preceded, and that in some cases the trouble was bilateral.

The tuberculum has a separate center of ossification but is connected with the cartilaginous line of growth by hyalin cartilage. Thus the slender shadow appears torn away from the tuberosity, but in reality is connected by cartilage. Nevertheless, Schlatter has called attention to a well localized disturbance which at times is due to trauma. It was later found that the great majority of the cases with this localized pain, swelling and an abnormal x-ray finding of the tuberculum, are occurring on the soil of late rickets. I remember a bilateral apophysitis of this kind where positively no trauma had preceded as far as the intelligent patient could remember. There was a well localized swelling and pain and the typical x-ray finding. No further treatment was necessary beyond abstaining from harsh exercise.

As all apophyses grow by endochondral ossification, disturbances in the deposition of lime salts will occur. These disturbances are not as great as on the ends of the diaphyses (the metaphyses) because the growing activity is, of course, much less in the former. Nevertheless, disturbances do occur often because the bones near the joints are more superficial and more exposed to trauma. Irregularities in the ossification of the tibial tubercle are of numerous shapes and the exposed location easily leads to mild forms of inflammation.

DR. C. C. CHATTERTON (St. Paul): We see a great many cases of painful knees in children along about "marble time," that is, when boys and girls are playing marbles on frozen ground or cement walks, and very often if an x-ray picture is taken we find that the tuberosity of the tibia is apparently loose, often in many pieces or fragmented. These cases primarily recover by simple supportive treatment with a bandage and pad over the knee. We very frequently find a similar condition, as far as the x-ray is concerned, in normal individuals. When the tuberosity of the tibia becomes infected, it certainly demands more than the usual protective treatment and practically always an operation is necessary to remove any dead bone or curette the granular area between the tuberosity and the shaft of the bone, removing the area of infection

and allowing the tuberosity to become united with the shaft of the tibia.

DR. BACON (in closing): I want to thank the gentlemen for their discussion. It has been very interesting to me.

The problem that came to my mind was that while my cases were distinctly traumatic and healed very promptly with rational treatment, I wondered why they sustained separation of both tuberosities instead of only one as described by Schlatter. It seems to me there must have been some nutritional deficiency, as suggested by Dr. Colvin.

I have been particularly interested, since seeing these cases, in examining the tuberosities of the tibiae in high school athletes, and to note the frequency with which sharply prominent tuberosities appeared. To me this would indicate that there had been some injury sustained.

ERYSIPELOID INFECTION FOLLOWING AN ABRASION

JOHN C. BROWN, M.D.,

Saint Paul

While cleaning up a Buffalo skull the knuckle on my right index finger was scuffed. It was thoroughly washed at once but it could not be made to bleed. Alcoholic solution of merthiolate was applied and the hand was bandaged.

The second day the knuckle swelled some and two red spots appeared on each side of the distal part of the joint followed by a similar pair on the proximal side on the same joint. Wet dressings were applied but additional paired spots both distally and proximally to the spots already found appeared. These spots were all alike in character and were not raised above the adjacent skin. They were red to wine colored and in none became confluent with each other. At this stage light treatments were started and at first seemed to slow up the process, but after about the third week the finger and joint began to swell and was very painful. When this was noted it was decided to give it an x-ray treatment. This was given at about 12 o'clock on Sunday. By the time I got home there was no pain in the joint and by the next day the swelling had gone and the spots were bleaching out. About four days after the first treatment it was thought best to give it one more exposure to the x-ray. This was done and the condition had cleared up in less than a week. Cast 3 represents the fulminating stage just before the first x-ray treatment. There was another peculiar thing noticed. This hand had a considerable blotching of vitiligo and all of the erythematous patches avoided these areas and were found only on the normally pigmented portions of the skin. There was no temperature at any time and only slight anesthesia and stiffness at the time of swelling just before x-ray treatments. Dr. Colvin examined the finger first and then turned me over to Dr. Madden for light treatment.

The meeting adjourned.

R. T. LAVAKE, M.D.,

Secretary.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

FOR AND AGAINST DOCTORS. Compiled by Robert Hutchison and G. M. Wauchope. 168 pages. Price, cloth, \$2.00. Baltimore: William Wood & Co., 1935.

NEW PATHWAYS FOR CHILDREN WITH CEREBRAL PALSY. Gladys Gage Rogers and Leah C. Thomas, of Robin Hood's Barn. 167 pages. Illus. Price, cloth, \$2.50. New York: The MacMillan Company, 1935.

COMPLETE HANDBOOK ON STATE MEDICINE. J. Weston Walch, Chief Compiler. 158 pages. Price, paper cover, \$2.50 for first copy, 75c each for additional copies to same school. Portland, Maine: Debaters Information Bureau, 1935.

HOMOGENEOUS X-RADIATION AND LIVING TISSUES. Wamford Mopett, M.D., Ch.M. (Sydney) 133 pages. Illus. Sydney, Australia: Australasian Medical Publishing Co., Ltd., 1932.

SYDNEY UNIVERSITY REPRINTS. Series VIII and IX and Monograph Series. (Four booklets) Illus. Sydney, Australia: University of Sydney.

THE PATIENT AND THE WEATHER. Volume I, Part I. The Footprint of Asclepius. William F. Petersen, M.D., 127 pages. Illus. Cloth binding. Ann Arbor, Mich.: Edwards Brothers, 1935.

THE PARATHYROIDS IN HEALTH AND IN DISEASE. David H. Shelling, B.Sc., M.D., The Johns Hopkins University and Hospital, Baltimore. 235 pages. Illus. Price, cloth, \$5.00. St. Louis: C. V. Mosby Co., 1935.

IMMUNOLOGY. Noble Pierce Sherwood, Ph.D., M.D., Professor of Bacteriology, University of Kansas, and Pathologist to the Lawrence Memorial Hospital, Lawrence, Kansas. 608 pages. Illus. Price, cloth, \$6.00. St. Louis: C. V. Mosby Co., 1935.

INFANT NUTRITION. Williams McKim Marriott, B.S., M.D., Professor of Pediatrics, Washington University School of Medicine, Physician in Chief, Saint Louis Children's Hospital, Saint Louis. 431 pages. Illus. Price, cloth, \$4.50. St. Louis: C. V. Mosby & Co., 1935.

THE HUMAN FOOT. Dudley J. Morton, Assoc. Professor of Anatomy, College of Physicians and Surgeons, Columbia University. 244 pages. Illus. Price, cloth, \$3.00. New York: Columbia University Press, 1935.

THE 1935 YEAR BOOK OF GENERAL MEDICINE. Edited by George F. Dick, M.D., et al. 848 pages. Illus. Price, cloth, \$3.00. Chicago: Year Book Publishers, 1935.

COMPLETE HANDBOOK ON STATE MEDICINE. J. Weston Walch. 158 pages. Price \$10.00. Portland (Me.): Debaters' Information Bureau, 1935.

This large paged volume is published for the assistance of the debater on either the affirmative or negative

side of the question of the advisability of the adoption of state medicine.

The volume is devoted to chapters on how to approach the study of the question, the preparation of affirmative or negative briefs and rebuttal notes. It consists largely of innumerable quotations from as many writers and should prove to be a valuable aid to debaters on the subject.

BEHAVIOR DEVELOPMENT IN INFANTS. Evelyn Dewey. 304 pages. Price, \$3.50. New York: Published for the Josiah Macy, Jr., Foundation, by Columbia University Press, 1935.

This is a survey of the current literature since 1920 on growth processes and infant behavior during the fetal period and the first two years of postnatal life, according to the plan being followed in the study of growth by the Normal Child Development Clinic of the Neurologic Institute of New York City. "Behavior" is defined as the neuromuscular and glandular reactions of living human organisms. Because social and emotional developments involve interpretations which lead afield into theoretical speculations, the scope of study was restricted; and there is yet, it is asserted, no satisfactory theory of the processes underlying strictly objective neuromuscular behavior patterns. Two current theories of growth processes are those of the biologists and those of the psychologists; objective evidence for the former is based on neurophysiologic data on the correlation of structure and function, and for the latter on human and animal behavior. The biologist—or neurophysiologist—has been handicapped in that his studies have been mainly concerned with animals. The point of view of "growth process," rather than performance at successive age levels, has been adopted.

The development of scales for measuring intelligence and the normal growth increments and the advances in the sciences of neurology and physiology are responsible for the great impetus to investigation of infant behavior. Clinical practice has profited by the establishment of norms obtained by observation of the behavior of groups of babies and simple tests at stated age periods from birth on.

The review indicates that methods of studying behavior and its specific patterns have made great strides in objectivity, in accuracy and in the quantity of results. However, it shows also that there is still a break between the fetal, the neonatal, and later period of development. And behavior patterns have not yet been followed sequentially from their inception to their fully developed form.

It appears generally accepted that the development of behavior follows, or is coordinate with, the development of neural structures. There continues controversy about the relative rôles of the environment and the innate neural matrix in controlling development. Instinct and learning are now regarded as parts of a continuous process of development, occurring, if not brought about, through the interaction of the environment and the organism. Two schools of psychology,

the behaviorists and gestaltists (configurationists) support differing views of behavior development. The former hold that "consciousness," or a mental factor in behavior, must be ruled out and that all accounts of behavior be made in simple mechanistic terms of stimulus response. The latter school denies instincts, it postulates a fundamental organization of the nervous system which serves to give the organism a certain very simple adaptation to the environment from the beginning. The tendency is now to discard the former, the older reflex-arc theory, and to support the gestalt or organismic conceptions of growth processes, and to emphasize with the neurophysiologists, in particular, that maturation of neural structures, at least to a certain degree, must exist before functioning occurs; to them growth in structure and its use are interdependent, each reacting upon and stimulating the other.

The text, published by the Columbia University Press, refers to prior contributions by Columbia investigators and to investigations reported from many countries, indeed to a bibliography of 216 publications listed at the end of the book.

JOSEPH C. MICHAEL, M.D.

Oral Immunization to Colds

For the last two winters, investigators have been studying the efficacy of an orally administered heterophile antigen vaccine in reducing the incidence of the common cold. The strains of common respiratory organisms used in the vaccine were selected for heterophile content and ability to resist the effects of gastrointestinal secretions. The organisms contained in each capsule were: pneumococci, 25 billion; Hemophilus influenzae, 5 billion; streptococci, 15 billion, and Micrococcus catarrhalis, 5 billion. The effectiveness seems to have been judged by the average number of colds occurring in the vaccinated group when compared with their average during the preceding three years and with "controls" not taking the vaccine. Aside from the theoretical objections to oral vaccination for colds, many of which are obvious, there are some specific reasons against the acceptance of this work as adequately controlled. For example, the group taken as controls had, in all instances previous to the experiment, a lower average number of colds per season than the vaccinated group. Furthermore, in view of the known factors of age, exposure and tremendous variation in colds from season to season and in different locations, any yearly variation in cold morbidity in one location or in small groups is of small utility as scientific evidence. The reports of the therapeutic value of orally administered "cold" vaccines are hardly convincing. (Jour. A. M. A., September 7, 1935, p. 804.)

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PROGRESS IN THE TREATMENT OF SOME DISEASES OF THE BLOOD*

WILLIAM P. MURPHY, M.D.

Boston, Massachusetts

ALTHOUGH isolated instances of severe anemia of unknown etiology had been observed even as early as 1822, the first fairly comprehensive description of the disease condition, now generally known as pernicious anemia, was made in 1855 by Thomas Addison in his work on the Constitutional and Local Effects of Disease of the Superarenal Capsules. In this description the condition was designated as "idiopathic anemia," because the anemic state was unattended by any demonstrable cause.

During the fifteen year period following Addison's discussion of the disease several reports of similar cases were published but it was not until 1872, in which year Biermer described a group of patients with severe anemia of varying etiology, that real interest in the subject was aroused. Biermer proposed the name "progressive pernicious anemia" as a designation for the group of miscellaneous cases of anemia which he described and this term has been more generally accepted than has the one proposed by Addison. In 1878 Eichhorst published a rather lengthy monograph on Progressive Pernicious Anemia, and five years later Laache of Christiania published a monograph on Anemia which consisted of 256 printed pages together with many graphs and plates illustrating the blood changes. The sporadic appearance of crops of papers concerning this interesting type of anemia bore evidence of the smoldering interest in this subject which persisted up to the time of the introduction of liver therapy.

Addison's clinical description of the disease, although not complete, was accurate in most

respects. The papers which followed added much to the clinical picture. Biermer called attention to the frequency of retinal hemorrhages during the severe stage and the occurrence of fever in his cases. Laache described particularly the presence in the blood of large, deeply colored corpuscles. Quinck had previously called attention to the variation in shape of the red blood corpuscles, the poikilocytosis. Hunter emphasized the importance of the previously described glossitis as an aid to diagnosis. The slight icterus, not observed by the early observers, the characteristic changes in the blood and the nerve manifestations were all subsequently described, thus leaving little of the clinical picture unrecognized up to the end of the first quarter of the present century.

New interest in pernicious anemia has been aroused since the introduction of its successful treatment with liver approximately ten years ago. Investigation during this period has been productive along several different lines.

Various theories as to the etiology were proposed in some of the early writings and perhaps the one of greatest interest, when considered in the light of our present knowledge, is that presented in 1880 by Fenwick in his book on Atrophy of the Stomach. Fenwick wrote, "Indeed most of the symptoms are not the immediate result of the atrophy of the stomach but arise from the deficiency of the blood produced by it." And again, "It will be readily conceded that the anemia that accompanies atrophy of the stomach is the result of the imperfect secretion of the gastric juice consequent upon it."

Clinical confirmation of Fenwick's concept, that imperfect gastric secretion plays an important role in the production of the anemia, is now

*From the Medical Clinic of the Peter Bent Brigham Hospital, Boston. Read before the joint session of the American Association for the Advancement of Science and the Minnesota State Medical Association, Minneapolis, June 25, 1935.

available. Evidence has been presented which indicates that the normal stomach secretes a substance which interacts with substances contained in certain foods to produce a blood building factor. Failure to secrete this substance or to ingest or utilize certain foods may result in the development of pernicious anemia. More recent studies suggest that there may be varying degrees of lack of the "intrinsic factor" or secretion, thus accounting for the variations in the severity of the disease.

During the seventy-year interval following Addison's paper two schools of thought existed concerning the fundamental process involved in the production of the anemia. One, championed by such men as Cohnheim and Ehrlich, believed that the primary disturbance was one of altered blood regeneration, whereas the other, led by Hunter, Muir and others, believed that the primary disturbance was one of abnormal blood destruction. Although the occurrence of abnormal amounts of bilirubin in the blood serum and the renal excretion of urobilin have perhaps never been adequately explained on an experimental basis, evidence which has become available during the past ten years leaves little room for doubt but that the fundamental cause for the anemia is one of altered blood regeneration. Pathologic studies of the bone marrow during relapse and various stages in the remissions of the anemia, the demonstration of a gastric secretion which influences blood regeneration and the events which follow the institution of liver therapy all favor such a concept. Although in addition to this there may be an abnormal destruction of red blood cells, it seems more likely that there is a failure to utilize certain substances necessary for the production of red cell stroma or of hemoglobin because of the absence of a proper stimulus to cell maturation.

This theory is strongly supported by the rapid disappearance from the blood stream of the bilirubin and from the urine of the urobilin during the first few days of a remission induced by liver therapy, the interval when rapid regeneration of blood cells and hemoglobin has begun and during which time the reserve supplies of blood forming substance are most needed. It is possible also that there is altered function of the reticulo-endothelial or Kupper cells of the liver or that the bile pigment is of such a nature that normal

excretion and utilization does not occur, thus giving rise to the hyperbilirubinemia and excretion of urobilin.

During the period of years prior to the introduction of liver therapy treatment of pernicious anemia was unsatisfactory and consisted largely of an effort to relieve the symptoms of the disease. Arsenic, in the form of Fowler's solution, was used for many years following its introduction by Bramwell, in 1877. Although remissions of the anemia were reported following its use in a few instances, the majority of patients did not respond to it. Iron was early found to be of little value when used alone. Mercury, mercurochrome intravenously, various foreign proteins, bone marrow and spleen as well as many other substances were tried, but without definite or uniform effect. Diluted hydrochloric acid became popular primarily for its effect upon the diarrhea and other gastro-intestinal disturbances, in which conditions it may still be considered to be of value.

Transfusion of blood became the principal method of treatment following the development of the methods of blood grouping. Although remission of some degree was frequently observed following transfusion there was a limit to the number of transfusions which might be given to any individual owing to the fact that, sooner or later, reactions occurred which prevented their further use. Transfusion was also an expensive method of therapy and was available in large numbers only for the patient with considerable means.

Splenectomy was in vogue at one time and was considered to be of benefit particularly in those patients in whom there was splenomegaly. It is possible that the beneficial results were actually observed in certain blood conditions which were then confused with pernicious anemia for rarely have we observed splenomegaly in our cases of true pernicious anemia since the introduction of more adequate means of differentiating the various blood dyscrasias.

Therapy which had as its principal constituent whole liver to be ingested in large amounts daily was first made available for general use in the spring of 1926. Even at that time simple water extracts of liver had been used successfully in the treatment of some of our patients at the Peter Bent Brigham Hospital and shortly thereafter was developed the method of extraction of

the active material from liver which formed the basis for the subsequent production of commercial extracts. These extracts were first administered perorally and in this form simplified treatment for the patient who found it difficult to obtain or to ingest inadequate amounts of whole liver. It still retained the disadvantage of necessary daily ingestion and proved to be an expensive form of treatment.

Further simplification of treatment resulted from the development of extracts of liver which could be used parenterally. These preparations have been designed both for intravenous and intramuscular injection and have varied in their concentration. Extracts for intravenous use have shown no advantage over those prepared for intramuscular injection and have the disadvantage of the danger of producing disturbing reactions. Highly concentrated extracts for intramuscular injection have been developed, which are characterized by their uniform and high degree of potency, and which will have the effect, for maintenance purposes, of fifty times the amount of liver from which they are prepared if this were administered perorally. At first prepared in such concentration that 5 c.c. represented the active material from 100 gms. of liver, later concentrated to 3 c.c., now it is refined and concentrated so that the active material from 100 gms. of liver is contained in 1 c.c. of the extract.

The introduction of extracts for parenteral administration has resulted in more rapid increase of the red blood cells following the institution of therapy during relapse and the greater concentration of the extract allows adequate initial and maintenance treatment to be carried out with minimal inconvenience to the patient.

Initial treatment during relapse may consist of the intramuscular injection of the extract obtained from 400 gms. of liver during the first twelve to twenty-four hours and, with the use of highly potent material, this should be sufficient to increase the red blood cell level, in an uncomplicated case, to between 4,000,000 and 4,500,000 cells per cubic millimeter within a period of four weeks regardless of the initial blood level. This will mean that cells may be formed at a rate greater than 100,000 per cubic millimeter per day during a period of twenty-eight days in those patients having the lower initial red blood cell

counts. The normal blood level of 5,000,000 cells per cubic millimeter will be reached quickly with subsequent weekly injections of the material prepared from 100 gms. of liver and this or a higher count may be maintained thereafter by the judicious selection of the interval between injections of a like quantity. Experience has demonstrated that generally one injection at two, three or four week intervals will be a proper maintenance dose, but this interval must be determined for each patient.

Because of its great efficiency the use of the concentrated extract offers a distinct economic benefit to the patient and to the hospital. Owing to the rapid and certain response the period of hospitalization may be shortened and the patient will be most quickly returned to economic efficiency. Rarely will it be necessary for the patient, with uncomplicated pernicious anemia, to remain in the hospital for more than two weeks, which means a saving to either the patient or to the hospital. It has been estimated that the amount of a highly potent extract for intramuscular use prepared from 100 gms. of liver will replace 5,000 gms. or approximately eleven pounds of whole liver or extract for peroral use prepared from 8,400 gms., approximately 18 pounds of liver, and its cost is only a fraction of the cost of either. The expense of injections will be relatively small with the use of the more highly concentrated and potent material because of the need for injection at infrequent intervals, and so another distinct saving in expense will be possible.

Not only has the chemist helped us to improve our methods of treatment but progress has been made toward the purification and isolation of the active principle in liver. Actively potent material has been isolated in crystalline form, probably amino-acids having the characteristics of the glucosamines.

The results of the liver treatment fully justify the benefits anticipated during the early years of its use. Although reports of inability to obtain optimal benefits to all systems involved are occasionally seen, such results may usually be attributed to inadequate dosage, incorrect diagnosis or to complicating pathology. With the use of adequate amounts of liver or of an effective substitute for it combined with intelligent supervision of the patient's entire regimen of living,

in so far as this may influence his fundamental disease condition, one may anticipate optimal benefits from the treatment, hardly equalled by the results obtained in the treatment of any other chronic disease state. Under the influence of adequate treatment and supervision of a patient with pernicious anemia, not hampered by a serious complication, the blood may be maintained in a normal state, the more important disturbances occurring along the alimentary tract, such as the glossitis, diarrhea and even constipation, will be improved and the disturbances resulting from spinal or peripheral nerve damage will be prevented or controlled and improved. Experience has shown that during continuance of an adequate regimen of treatment, death of a patient would not occur from pernicious anemia, with the possible exception of the rare patient in whom satisfactory control of the anemic state may be prevented by the presence of some intercurrent complication which in itself will not cause death.

Owing to the fact that treatment by this method has been carried out for a period of time only slightly more than ten years it is not possible to predict how long one may continue to remain in good health under a regimen of adequate therapy. Present indications are that this is possible during the natural life span of the individual and that death will result from other illnesses to which we are all susceptible. Of forty-five cases reported in the spring of 1926 as having been under treatment for varying periods of time up to one and one-half years it has been possible to follow forty-two. Of this number thirty-one are still living, eleven have died but, with the possible exception of one patient, death resulted from causes other than those which might be attributed to a condition related to pernicious anemia.

Complicating pathologic states have occurred frequently but with rare exceptions has any single complication been present sufficiently often so that an unusual susceptibility is to be suspected. Unusual distribution of skin pigmentation, particularly that irregular, blotchy distribution of pigment known as vitiligo, has been observed most frequently. Around 10 per cent of our patients have shown vitiligo, varying in distribution from small areas on hands and arms to large ones on the face, neck and even generally

distributed over the body, and of course particularly prominent during the summer months. Cystitis and pyelitis and disturbances of the biliary system have occurred rather frequently. Diabetes mellitus, arthritis, cardiac difficulties, hypertension, phlebitis, nephritis, asthma, hyper- and hypothyroidism and malignancies involving almost any part of the body have each occurred in a small percentage of instances. Pulmonary difficulties, such as pneumonia and tuberculosis, have been notably rare in their occurrence. Based on the evidence presented one may therefore conclude that the life expectancy of the well treated patient with pernicious anemia is that of the average of those persons in the same age group.

With progress in the development of our knowledge concerning the problems of the pernicious anemia patient there has become available information of value in the control of two other fundamental blood diseases, notably anemia of the so-called secondary or hypochromic type and agranulocytosis or acute granulocytopenia.

Interest in the treatment of hypochromic anemia dates from Dr. Bland's report in 1832 of the successful control of chlorosis with the use of iron in the form of ferrous carbonate. Although this severe and interesting form of anemia, described as occurring almost entirely in young women, has practically disappeared, its place has been taken by a hypochromic anemia observed in severe form almost entirely in women above the age of thirty. This condition at one time known as chronic chlorosis is in this country now more commonly called idiopathic hypochromic anemia, whereas in Europe it is often referred to as achylic hypochromic anemia. There are no fundamental differences between the blood picture observed in this condition and in chlorosis and it is quite probable that the fundamental disturbance is the same in both and that the clinical differences noted are dependent upon the difference in the age group affected and upon the greater chronicity of idiopathic hypochromic anemia as contrasted with the more acute chlorosis. The blood is characterized in the more severe occurrences of the disease by a remarkably low hemoglobin level as compared to the alteration in red blood cell level, resulting in some of the lowest color and iron

index values recorded. Clinically the condition may often be suspected by the peculiar tan colored pallor, particularly evident in the patient with brown eyes in whom it so frequently occurs, by the dry skin and brittle finger nails. Soreness of the tongue is noted frequently and achylia gastrica is often but not uniformly present.

As originally observed in chlorosis, iron remains the treatment of fundamental importance in the large group of hypochromic or iron deficiency anemias which includes, in addition to the idiopathic type, anemia resulting from chronic loss of blood, that occurring during pregnancy, and that accompanying infections. It is generally conceded that the peroral use of iron in the form of a salt is more effective than when administered parenterally. Although there is undoubtedly some difference in the efficiency of the various iron salts available for use it is likely that adequate doses of any will produce a satisfactory result and the choice of salt is to be made on the basis of convenience of administration and their effects in other ways than blood building. Some iron salts are more likely to be constipating than are others.

Whereas our knowledge concerning the use of iron has progressed little since Dr. Blaud's day, studies carried on recently have aided us in utilizing means of enhancing the efficiency of the iron. Regulation of the diet so that it will supply the usual needs of the normal person or the unusual need of the individual patient under consideration is usually advisable. Whole liver alone is an effective means of building hemoglobin and when used in conjunction with iron the combined effect is greater than is that of either alone. Liver extracts for use perorally have shown little effect in the anemias of man, whereas when administered parenterally the effect is distinctly better both in respect to hemoglobin formation and clinical improvement. This effect, as opposed to that observed from the peroral use of liver extract, is perhaps due to the much larger amount of efficient material used or to some difference in utilization of the materials.

A condition characterized by severe leukopenia largely dependent upon a decrease in cells of the granulocytic series, without striking anemia or an unusual tendency to bleed and associated with

ulceration and necrosis of mucous surfaces, was first described by Schultz in 1922. This condition he designated as agranulocytosis. Since Schultz' original description of his cases many others have been reported with a leukopenia and decrease in the symptom-complex described. Inasmuch as the cases described vary considerably in chronicity and probably as to etiology and because the present discussion deals primarily with the typical acute cases, it may be well to classify them as acute granulocytopenia.

The typical attack of acute granulocytopenia or agranulocytosis is generally preceded or accompanied by evidence of an infection, perhaps most often focal in type but occasionally generalized. The onset is usually abrupt with severe headache, high fever, rapid pulse, chill, and frequently generalized aching, sore throat and spongy sore gums. The onset may simulate an attack of so-called "grippe" although the degree of prostration is generally far greater than the physical signs of the illness warrant. Following this abrupt onset there may occur, if treatment and consequently improvement be delayed, a gangrenous or necrosing lesion involving the throat or tonsillar region, the buccal or other mucous surfaces as the vagina, cervix, anal regions or even the mucosa of the intestinal tract. With the latter involvement diarrhea may occur. The ulcerations or necroses are not to be considered as the primary infection but rather as secondary to the granulocytopenia. During the course of the illness there may occur a rash, herpes labialis, nausea and vomiting, dysphagia and occasionally epigastric pain and tenderness. Broncho-pneumonia has been present frequently in the terminal stages and this may be accompanied by jaundice.

During the stage of onset the blood generally shows some degree of leukopenia, the leukocyte count may range between 1,000 and 2,000 with a decrease, but not complete absence, of granulocytes. During the next few days the process may progress rapidly, with increase of the leukopenia to levels under 1,000 and the granulocytes may entirely disappear from the stained blood film. The hemoglobin, erythrocyte and platelet levels are rarely disturbed. Occasionally anemia of moderate degree is present, possibly because of its pre-existence in the individual affected. Although Schultz postulated the absence of

hemorrhagic tendencies, cases probably typical in other respects have been reported with evidences of purpura and bleeding. The occurrence of such a condition should, however, lead one to suspect the presence of some other blood dyscrasia. The icteric index will be increased in the presence of jaundice.

In the earlier reports of this condition the prognosis was considered to be distinctly unfavorable. The great majority of cases progressed rapidly, usually within a few days, to a fatal termination. With the introduction of treatment by means of small doses of x-ray over the long bones, with the use of nucleic acid derivatives and, perhaps more important, the earlier recognition of the condition there have been many more recoveries. It is not my intention, however, to discuss either the etiologic factors concerned or the advantages of the various forms of treatment advised but rather to indicate the possible value of liver and its extracts as therapeutic measures.

During the early days of the use of whole liver in the treatment of pernicious anemia it was observed that the granulocytes of the blood increased in number coincidentally with the increase of the red blood cells. With the use of liver extracts parenterally even more rapid response of the granulocytes was noted. It seemed advisable to determine whether or not this response was peculiar to pernicious anemia patients and a natural consequence of improved

bone marrow function. It was then observed that a striking granulocytic increase occurred in normal subjects following single intramuscular injections of a concentrated solution of liver extract. Similar responses occurred in patients having an acute upper respiratory infection in whom a moderate degree of granulocytopenia was present.

With this evidence available it seemed logical to expect to obtain favorable results in the treatment of acute granulocytopenia. Six typical cases have been treated with daily or more frequent injections with recovery in each instance. Several similarly treated cases have also been reported in the literature, with recovery in each instance in which it was evident that adequate therapy was used. Two patients, having had respectively ten and two relapses of granulocytopenia, have now been observed for over four years without relapses, during which time they have taken regularly either whole liver or extract perorally.

Although the evidence available may be insufficient to establish the value of liver as an important prophylactic measure or of liver extract administered parenterally as the treatment of choice, the evidence is sufficient to warrant further use which may prove that liver or its extracts are quite as valuable in the control of acute granulocytopenia as they are in pernicious anemia.

ENDOCRINE THERAPY*

ELMER L. SEVRINGHAUS

Associate Professor of Medicine, University of Wisconsin

Madison, Wisconsin

ENDOCRINOLOGY, the study of the glands of internal secretion, is a relatively young branch of medical science. It is, therefore, not surprising that certain portions of this field are much better understood than others. Some of the discoveries made in research laboratories in the last few years give promise of startling results when the new knowledge can be applied

in the treatment of sick persons. It is possible to do harm as well as good with the powerful extracts which can be made from several glands. Consequently, a caution needs to be sounded as to the use of any potent glandular products except by physicians who thoroughly understand their use. In some cases the experience of the medical profession is sufficiently extensive that the general practitioner may safely use the glandular materials. Other preparations should, at

*Read before the annual meeting of the Minnesota State Medical Association, June 25, 1935.

present, be applied to humans only by those research investigators who are equipped to decide who needs treatment, and what should be given, and to watch for any signs that would require interruption of the treatment. It is, therefore, important to point out to the medical profession, from time to time, which gland extracts are in one class, which in the other.

Thyroid Gland

Deficient action of the thyroid gland leads to cretinism in childhood or myxedema in adults. There is one specific treatment universally recognized, the use of dried thyroid glands in tablet form. For the sake of uniformity in results it is preferable that we use only U. S. Pharmacopœia standardized thyroid. This is available in tablets containing from 1/10 to 5 grains each. Doses per day vary from 1/4 to 5 grains. The need for any one patient must be determined by the use of the basal metabolism test, the study of weight, pulse rate, skin, nervous, and muscular action, and mental changes. It is unsafe for thyroid to be used except under a physician's guidance. The treatment is not a cure but a replacement of the deficiency, and must usually be continued throughout life. There is no acceptable substitute for the use of thyroid. Thyroxin is not better.

Excessive action of the thyroid gland occurs in several forms, but the distinctions between these are beyond the scope of this lecture. The condition of the patient, the nature of the thyroid gland in the individual, the duration and the probable cause of the trouble are among the factors which will determine exactly which course of therapy is to be followed. The general principles to be followed are to remove the causal factors when they can be identified (unfortunately true too infrequently), or to interrupt the dangerous process by the removal of most, but not all, the thyroid gland. This removal is done either by surgery or the use of the x-ray, which causes gradual destruction of the gland. Surgery is most widely used, is quicker, must be used when prompt results seem imperative. The dependability of the x-ray for properly selected cases is increasingly evident. The x-ray method must never be used except by radiologists who are equipped to measure the dosage and who can coöperate with physicians in deciding on the extent of the treatment. Thyroid surgery

has had its dangers greatly reduced since the Mayo Clinic group demonstrated the advantage of using small doses of iodine during the days immediately preceding the operation. Iodine must not be thought of as effecting a cure; it prepares a patient for operation with less risk. The after-care of patients who have had thyroid removal is a chapter requiring numerous details of dietary, hygienic, and medical precautions. The fact that recurrences are recognized following even the best therapy of today is evidence that this program leaves still better methods to be sought for.

Iodine is, undoubtedly, one of the essential foods. Deficient supply of iodine is at least one factor in the production of the colloid goiters so common in some regions of the United States, including the Great Lakes region. This iodine can be best supplied to the population by the universal use of iodized salt. It may be that with the conventional amounts of iodine in use, the supply via the salt route might be inadequate, especially for rapidly growing children. Therefore, it is usually considered wise to add the use of small tablets of some form of iodine once weekly throughout the school year for children in this area. There is little reason to believe that the use of these amounts of iodine can cause any thyroid disease, as was feared for some years. The use of iodine to assist in the control of these adolescent colloid goiters is good practice. It may best be given internally. The treatment is not commonly successful after adult growth has been attained.

The use of thyroid tablets in the reduction of excessive weight is widespread. Under medical supervision of a very careful sort it may be safe. The use of any sort of thyroid preparation without medical advice is definitely unsafe. It is futile to attempt to avoid the need of dietary limitation by the use of thyroid. Usually careful physicians prefer to do without the use of thyroid unless there is evidence for a partial hypothyroidism as a causative factor in the obesity.

Parathyroid Glands

Damage to the parathyroid glands or their removal during surgical treatment of hyperthyroid states leads to tetany. The picture is permanent only when the glands are entirely destroyed. For acute emergencies of this type there are two steps: the hypodermic injection of the

parathyroid extract, using doses of 100 units, and the intravenous injection of calcium salts. Of the latter, the calcium gluconate is the easiest and safest to give, using the 10 per cent solutions available. Calcium chloride is a little more effective, but should be diluted to 0.5 per cent in normal saline. For the continued treatment of these patients the diet is to be chosen so as to furnish an abundance of calcium, a low supply of phosphorus, and it, therefore, must contain no milk, little meat, and other details need attention. Calcium can be further assured by administering the gluconate in tablet form, or the chloride in dilute solution. The use of the parathyroid extract is probably best reserved for emergencies. It is still in an impure state, and after prolonged use its effectiveness is gradually lost.

There are now recognized several states in which the fundamental trouble is overactivity of the parathyroid glands. The results are either a diffuse demineralization of bones or the formation of cysts in various bones. There is frequently the deposition of calcium in non-osseous structures, the most dangerous being in the kidneys, where serious forms of renal damage follow. One of the kidney problems is the formation of recurrent stones, in the renal tissue or in the pelvis or ureters. These cases of hyperparathyroidism are still rather infrequent. The differentiation of these from other types of bone and kidney trouble is still impossible without skilled x-ray examination plus study of blood calcium level. Therefore, it is advisable that any patient who is suspected of a parathyroid disturbance be sent to one of those well equipped hospitals where these factors can be evaluated. The results of surgical therapy in the earlier stages of this trouble are brilliant. The profession must be alert to detect cases early.

Thymus Gland

The thymus is situated adjacent to the thyroid. It seems evident, from the work of the last two years, that this gland is important in the rate of development from infancy to maturity. It does not seem to cause excessive growth. With the preliminary knowledge we have, it is far too early to attempt any treatment of human cases with thymus gland extracts. Perhaps we should

be more cautious about the use of x-ray treatment over the thymus region, to avoid destroying a gland which may be of importance. An enlarged thymus is probably not as dangerous as was formerly supposed, except when it interferes with respiration.

The Pancreas

Deficient action of the pancreas is one of the commonest causes of diabetes mellitus. In addition to reduced ability to supply insulin to the body, it is now suspected that other factors may be important at times, such as interference with the activity of the insulin which is present, or disturbances of certain organs such as the liver and muscles where sugar is used. Nevertheless, the therapy of diabetes is still carried out essentially as if it were simply a deficiency in the insulin supply, to be made good by dietary readjustment with or without the use of insulin hypodermically. Until we know a great deal more about the causes of this common disease we can do little else in its treatment. In the meantime the outlook for long life and useful and otherwise healthy existence for the diabetic has been enormously improved by the discovery of insulin. It is agreed that use of insulin without careful dietary regulation is an unsafe practice. The diet should be adequate in calories for the maintenance of the individual at whatever occupation he chooses. The protein allowance should be moderately restricted, not less than 50 nor more than 100 grams per day. The ratio of carbohydrate to fat varies rather more widely today than it did ten years ago, but there is still very little evidence to show danger from the use of sufficient fat to supply at least two-thirds of the calories. The diets which are low in carbohydrate often make possible the avoidance of insulin, or the use of smaller doses. The carbohydrate supply must be large enough so that there will be no acetone bodies in the urine. If such a maintenance diet cannot be taken without glycosuria or hyperglycemia, the use of insulin is indicated. The doses have to be determined by trial in each patient. The maximum dose per day, for the most severe diabetic on a maintenance regime, seems to be less than 100 units. The number of doses per day varies from one (usually before breakfast) to four, given before meals and at bedtime. In the cases

of great severity, it is commonly possible to attain success with three doses if the first is given on rising, and the other doses at as nearly as possible eight-hour intervals thereafter. The meal schedule is not disturbed. The size of the individual doses is to be adjusted to that point at which there will be neither sugar in the urine at any time of day, nor the symptoms of an abnormally low blood sugar. If both ends do not seem attainable with reasonable ease, it is better to avoid the hypoglycemic reactions, permitting slight traces of glycosuria in the early morning hours. In caring for these extremely severe patients, we come to recognize the speed with which the pancreatic hormone acts, as shown by the very rapid changes in the blood sugar level. The use of blood sugar determinations to control the progress of a diabetic under therapy is very essential, if these changes are to be recognized. In this connection it must be recalled that with normal persons or with diabetics not using insulin the blood sugar is near its lowest level before breakfast. When insulin is used, the blood sugar is at its highest at this time. The effectiveness of a single dose of insulin lasts for from six to ten hours.

There is, so far, no useful substitute for the hypodermic injection of insulin. Materials to be taken orally are not helpful enough to be dependable. The numerous substitutes offered are usually fraudulent and may be dangerous to the life of the diabetic by delaying the necessary use of insulin.

There is an increasing number of non-diabetic patients in whom symptoms resembling the insulin reaction have led to a diagnosis of hypoglycemia. In a few cases it has been proved that there was an associated pancreatic tumor, with overproduction of insulin. Removal of the tumor has given brilliant results. Probably most of the patients suffering from recurrent attacks of hypoglycemia have no tumors. Surgical exploration of such patients should be undertaken only after a careful study leads to a genuine suspicion of a tumor. The other patients can usually be controlled in comfort by the use of special types of diet. Two fundamental approaches are advised: that with frequent moderate sized feedings which furnish sufficient carbohydrate to maintain a satisfactory blood sugar level, or a routine with low carbohydrate and high fat meals, to avoid the vig-

orous stimulation of the production of insulin which may follow too high a carbohydrate intake. The possibility of these symptoms coming from hepatic disease must be kept in mind.

The Adrenal Glands

The adrenal medulla is a specialized portion of the sympathetic nervous system, and the secretion of its hormone, epinephrine or adrenalin, leads to an increased response by the tissues following sympathetic stimulation and to these same responses even without that nervous stimulation. The material acts very quickly and for very short periods after intravenous injection. It is rapidly destroyed after it enters the circulation. Replacement therapy for deficiency of the adrenal medulla is not recognized in modern medicine. The therapeutic use of adrenalin as a vasoconstrictor, antiasthmatic, cardiac stimulant in syncope from certain shocks, et cetera, is a specialized use of a very active principle, but is hardly analogous to the other phases of endocrinology. Excessive epinephrine output probably occurs in unusual tumors of the adrenal medulla.

The adrenal cortex is a typical endocrine gland, the integrity of which is essential for life. Partial deficiencies in its function are very poorly defined although they are suspected in asthenic states. Until more specific diagnostic criteria are demonstrated it is wise to avoid speculation and gland therapy here. The picture of extensive damage to the adrenal cortex is widely recognized as Addison's disease. The discovery of active extracts of the adrenal cortex in the past few years has greatly improved the treatment of the crises of this disease. It is probably life saving to use even the weak commercial preparations now on the market, such as eschatin. Recent reports suggest that more potent extracts, to be used orally, will soon be available. For the present it is necessary that the maintenance of these chronic patients be carried out essentially by the use of increased amounts of sodium chloride and sodium bicarbonate orally, which is only partially successful. For the critical periods the use of the cortical extract should be in doses of 10 c.c. or more daily. It seems increasingly probable that the adrenal cortex will be shown to have more than one function, and to produce more than one hormone. Patients with Addison's disease, es-

pecially when not associated with tuberculosis, need to be studied in institutions prepared for the specialized details and for the expensive therapy involved.

The Testes

There is no longer any doubt that the testis produces two hormones, which are concerned with the accessory reproductive organs and the secondary sex characters, and with the reciprocal control of the pituitary and testes. But to date we have no dependable preparations of these materials for clinical use. Until there are standardized and purified extracts furnished by reputable drug houses, it is urged that the use of testicular hormones be avoided. From what we already know about their action, it is easily possible to do harm by the use of improperly selected extracts. The male climacteric must be treated symptomatically while we wait. Impotence is probably not susceptible to treatment with testicular hormones.

The Ovaries

The ovaries produce two well defined hormones, the follicular hormone which is called estrogenic because it causes the heat reaction or estrus in animals, and the corpus luteum hormone. The estrogenic substance leads to the uterine and vaginal development of maturity, and it is responsible for secondary sex characters. The action of the two hormones is involved in the normal menstruation mechanism, and both are necessary before a fertilized ovum can become successfully imbedded and a placenta formed. Both hormones are essential for the development of the breasts to the point where lactation can be initiated by the pituitary lactation hormone. In practical therapeutics, it is seldom of use to bring about these processes by endocrine therapy, because the necessary production of an ovum is usually also lacking when these processes are absent. The ovum production and liberation cannot be substituted for by the use of ovarian hormones. In fact the use of the estrogenic hormone tends to suppress the functions of the ovary, by inhibiting the pituitary stimulation of the ovary.

There are two recognized functions of the estrogenic hormone in human therapeutics: the relief of climacteric symptoms and the hastening of a cure of vaginal gonorrhea in children. In

the menopause the relief from the nervous disturbances by the daily administration of the follicular hormone preparations is striking, and can be secured in practically all cases. Treatment is best given in one to three doses daily rather than in massive doses at longer intervals. The daily dose should be the minimum which secures control of the easily recognized hot flashes, insomnia, and emotional instability. Oral therapy is now so easy and inexpensive that it is the method of choice. Amniotin, progynon, and theelol are about equally successful, and the cost for effective treatment increases in the order named. Treatment should be continued as long as symptoms recur when the hormone is omitted. The size of the dose can be gradually reduced as therapy is maintained. The material seldom need be used longer than two years. The most effective way of treating gonorrheal vaginitis seems to be by the use of the hormone in gelatine suppositories, administered per vaginam.

The present indications are that the important functions of the corpus luteum hormone include the relief from crampy types of dysmenorrhea and from threatened abortion of some types. There are still no commercially available preparations of this hormone. The materials sold as containing the corpus luteum hormone contain negligible amounts, and should no longer be used for any purpose.

The Pituitary Gland

It is certain that the pituitary gland has numerous functions, and that it produces several hormones. The posterior lobe extracts are useful in the control of low blood pressure in some emergencies, in relief from intestinal atony, in stimulating uterine contractions post partum, and in relief from the polyuria of diabetes insipidus. The later condition is looked upon as a deficiency of posterior lobe secretion. For the clinical control of such polyuria the pituitary material may have to be used from one to four times daily. It is usually used hypodermically. A few years ago it was shown that nasal insufflation of the aqueous extract was successful. More recently it has been shown that the least irritating and expensive method is by the use of minute amounts of dried posterior pituitary powder as snuff. Patients quickly learn to regulate the dosage to the minimum amount and frequency. There is still much debate as to whether there

is any advantage to the use of the fractionated extracts of the pituitary which affect, chiefly, blood vessels or uterus, respectively. Possibly the judicious choice of the dose will still allow optimum results with the U. S. P. solution of posterior lobe.

The anterior pituitary extracts are now known to have a number of different actions. The subject is highly confusing. Before use of any pituitary material, one should be very sure that he knows which activities may be expected from the given extracts. No pituitary preparation should be given to humans until it is available in a standardized solution, *i.e.*, with activity definitely limited in both kind and amount.

The pituitary extracts which will stimulate skeletal growth are now offered by two reputable manufacturers in the United States. It is worth while trying this extract on any dwarf whose epiphyses have not yet united sufficiently to prevent growth of long bones. It appears that not all dwarfism is due to a pituitary deficiency, and only a limited number of dwarfs respond to therapy. We have no way as yet of deciding in advance which types are favorably influenced. Any results are detectable in a matter of a few months. Hypodermic doses of 1 to 2 c.c. of the two extracts now available two to three times weekly seem to suffice. In some cases, results are better from the combination of these extracts with thyroid orally than from either gland product alone.

There is now available one pituitary extract

which is known to stimulate the maturation of the ovaries, the liberation of mature ova, and the formation of corpora lutea. The application of this material to human problems is complicated by the intricacies of differential diagnosis in gynecology. Indications for the use of this pituitary extract, the size and timing of doses, and the choice of hypodermic or intravenous routes of administration—these factors must be studied much longer before any general statements can be made about the proper use of the material. It is probably of help in hypofunction of both the ovaries and testicles, as seen in the Froehlich syndrome and other forms of sexual infantilism. It is recommended that for the present this material (prephysin) be not used except in those clinics where the diagnostic problems can be carefully worked out and the results of therapy checked by special gynecological methods.

Pituitary extracts which will affect the thyroid, the adrenals, the breasts, and other organs are not yet available outside the laboratories for animal work. Particular attention is called to the recent world-wide interest in the possible association of diabetes mellitus and the pituitary. As yet there is no clinical application to be made of these very important laboratory studies on animals. It is not proper that we should attempt radiation of the pituitary for the relief of diabetes. In fact, radiation to reduce or destroy pituitary action is not indicated at present except in the demonstrable presence of certain tumors in the sella.

DEEP ABSCESS OF THE NECK*

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I HAVE chosen a subject which should be of interest to every type of physician, since the doctor in the remotest district, as well as the specialist or internist in the service of the largest hospital, may be confronted at any time by a deep abscess of the neck.

While occasional instances of deep cervical

abscess may occur at all seasons or periods, it has been the writer's experience that such cases are oftenest encountered after epidemics in which the upper respiratory tract and its accessory cavities are acutely involved. And this should be expected, since abscess of this type in every instance is a secondary affection.

While almost any portion of the deep structures of the neck may, under certain unusual

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circumstances, become involved, there are four potential spaces which are most susceptible to infection and abscess, and abscess, when occurring, is nearly always in one or another of these.

The first lies behind the nasopharynx, in front of the vertebral column, and extends from the base of the skull to the mediastinum. Abscess in this region is called *retropharyngeal*.

The second space lies in the floor of the mouth and abscess formation here has received the name of *Ludwig's angina*.

The third space is lateral to the pharynx and lies between the pharynx and the inner surface of the lower jaw. It extends from the base of the skull to the angle of the jaw, is a rather well confined area, suppuration in which is called a *pharyngo-maxillary abscess*.

The fourth space is along the course of the carotid sheath and extends from the angle of the jaw to the mediastinum.

Each of these spaces is separated from the others by a natural barrier, chiefly by some portion of the deep cervical fascia, and hence an abscess in one does not involve another unless the infection breaks through the barrier or is carried through by veins or lymphatics.

The word "space" is an unfortunate one to use in this connection but there seems to be no good substitute. Normally there are no spaces in the neck; certainly no open cavities such as we think of when we think of space. The spaces occur only when certain susceptible areas in the neck are infected and abscessed. The abscess creates the space it occupies by destroying the loose connective tissue present and by pressing aside the adjacent tissues or organs. A space therefore in the sense used here is a region of the neck which contains a good deal of loose connective tissue. The four regions or spaces mentioned above contain more connective tissues than others of the neck and hence are potential cavities in which an abscess can more readily form.

Retropharyngeal abscess nearly always occurs in children. There is a reason. The lymph nodes are better developed in children than in adults. The retropharyngeal nodes are especially well developed in early life but disappear or become atrophied in later life. The pathology is that of an infected lymph node. The result of infection of the node is a breakdown of the

glandular structure with abscess formation. Since the glands involved lie behind the prevertebral fascia the abscess gravitates along the fascia in front of the vertebral column and may reach the mediastinum. There usually is a history of recent inflammation of the nose and upper pharynx but sometimes no such history is obtainable, in which instance the child's symptoms may not at first be properly interpreted. There is stoppage of the nose caused by the pouting of the abscess behind the palate. Difficulty in swallowing is an early symptom and often fluids are rejected. If of nursing age, the child may refuse the breast. There is evidence in the child's appearance of serious illness. There is pain, often difficult breathing and a varying degree of fever. Because of its deep location, there is no external tumor, but on inspection of the throat a midline bulging of the pharynx may be seen. The soft palate may be pushed forward. Palpation of the nasopharynx would disclose the presence of a tumor-mass and perhaps fluctuation could be made out by this maneuver; but palpation of the nasopharynx of infants and young children should not be attempted without excellent reason since the space is small and the passage of the finger into it may split the palate. The writer has seen such mishaps. But should investigation by this means seem necessary and advisable, the precaution of lowering the child's head should not be overlooked, since, should an abscess be present, it may be ruptured by the manipulation of the finger, and, should this happen, immediate gravity drainage is necessary to prevent strangulation.

This type of abscess tends to gravitate down the neck unless checked by inflammatory adhesion. On reaching the level of the larynx, there is likely to be serious interference with breathing, and suffocation from obstruction of the abscess and from laryngeal edema may take place. Spontaneous rupture of the abscess, which may fill the respiratory tract, may also occur at any moment and may suffocate the child.

The affection known as *Ludwig's angina* is confined to the floor of the mouth. The suppuration, if present, is limited to the space bounded by the hyoid bone below, by the tongue above and by the muscles and fascia which comprise the root of the tongue behind. The affection occurs chiefly in adult life. Dental infections and dental operations in the presence of infection are

chief among the causes. Injuries of the mucosa of the floor of the mouth are occasional causes.

The muscular structures of the floor of the mouth rest upon beds of fine, loose areolar tissue that would seem to invite infection. This loose tissue passes from one side of the mouth to the other without meeting the slightest obstruction and hence the disease may begin on one side but pass readily to the other, the spread resulting in involvement of the entire floor of the mouth.

In event the abscess is confined to one side, the tongue is pushed over strongly to the opposite side. If the affection is bilateral the tongue will be crowded against the roof of the mouth and back over the glottis so as to obstruct respiration, sometimes seriously. The mucosa of the floor is greatly swollen and Blassingame speaks of it as sometimes having the appearance of a second tongue. The tongue often fills the mouth so full that the organ shows indentations from the teeth.

Pain in the sublingual region, stiffness of the jaws amounting often to inability to open the mouth, a temperature that may be moderate or high, dyspnea and dysphagia, are chief symptoms. There is a hard swelling under the margin of the mandible, anterior to the submaxillary gland, and this may spread across and occupy the whole region between the jaw and hyoid bone. The swelling is board-like and does not fluctuate externally until late, until it has broken through muscles and fascia and has approached the surface of the neck beneath the mandible.

Phlegmon in the third location I have named is commonly called *pharyngo-maxillary abscess*. This space has been variously described by different writers and its exact whereabouts seems not generally well understood. In simple language it lies between the lateral wall of the pharynx and the inner surface of the mandible and extends from the base of the skull to the angle of the jaw.

The chief site of entrance of infection is the pharyngeal wall, on which sits the tonsil. Tonsillitis or quinsy frequently precede infection of this space. Abscess in this location often follows the removal of the tonsils, especially if the operation is done under local anesthesia. Shapiro has reported 103 cases following tonsillectomy. The blame for such deep infection has been attributed to the manner of injecting the anesthetic

solution. It has been claimed that the needle has been pushed first through the infected tonsil, where the point became contaminated, and that then it was inserted deeper into the space in question, where the infected material was deposited. Shapiro also lays part of the blame on the fluids injected. He made an examination of the solutions used in six hospitals and found four were contaminated. Anatomical study of the pharyngo-maxillary space can leave but little doubt but that infection can easily occur from one or both these sources.

The abscess which characterizes a quinsy always lies close to the pharyngo-maxillary space and may break directly into it. Or the infection may be carried to the space from the primary focus through either veins or lymphatics. In event the venous channel is the carrier, general septicemia usually accompanies the abscess, which, in such instance, may be multiple, the abscess formation often locating in distant parts of the body.

The chief symptoms of abscess in this location are stiff jaws, fever and the presence of a hard lump in the upper neck just posterior to the submaxillary gland. Difficulty in opening the mouth subsequent to infection of some part of the upper respiratory tract, and especially following a tonsillitis or quinsy, should make one think of abscess of the pharyngo-maxillary space. In severe instances the patient may not be able to open the mouth sufficiently to separate the teeth, when, of course, satisfactory inspection of the mouth and pharynx would be impossible.

The temperature may be moderate, 101°-102° F., or it may rise to 104°-105° F. In the higher figures, especially when preceded by chills, thrombosis of a large neighboring vein, often the internal jugular, has probably taken place. Many such instances have been reported and the writer has seen three such complications.

Fluctuation of the tumor at the angle of the jaw has seldom been present, in the writer's experience—at any rate not in the early stages. The superficial and deep layers of the cervical fascia of this region of the neck are dense and unyielding and it is chiefly for this reason that the presence of pus can not be determined by palpation. However, after a variable time the pus may necrose its way through these dense fascial barriers and come near the surface. But it should be emphasized that there are other ex-

its offering less resistance and hence the outbreak is oftener through the wall which separates it from the carotid sheath, on reaching which it will descend along the sheath under cover of the sternomastoid muscle, unless, of course, its downward progress is arrested by inflammatory adhesions.

As stated above, the pharyngo-maxillary space lies near the pharyngeal wall and hence the abscess often points into the lateral wall of the pharynx. This swelling may often be seen in the region of the tonsil, provided the mouth may be opened widely enough to make the inspection. Rupture and drainage in this direction is of frequent occurrence.

Abscess Along the Anterior Space of the Carotid Sheath

Abscess in this location occurs in two ways. First, should pus which has accumulated in one of the other spaces, already mentioned, continue under pressure and unrelieved, outbreak into the loose connective tissue along the carotid sheath may occur. Second, the abscess may follow the infection and disintegration of one of the numerous lymph nodes which lies upon upon the anterior wall of the sheath. All lymph drainage from the head finally reaches this chain of lymph nodes and, following serious infection of the structures higher up, disintegration of one or more nodes is likely to occur.

Abscess in this location is well covered by overlying structures of the neck and hence fluctuation usually is a late symptom. Before it can reach the surface where it may be palpated, the pus must break through dense layers of fascia. I mention this fact and emphasize it for the reason that the necrosis and outbreak of the pus is just as likely to be through the carotid sheath, *inward* instead of outward, and thus to contaminate the contents of the sheath, the carotid arteries, internal jugular vein and vagus nerve. The writer has seen instances of this, and cases of like experiences of others are on record. To await fluctuation for diagnostic or operative purposes seems unwise, therefore, in many instances. It certainly would be unwise if septic fever is already present or is threatened, or if the respiratory function is greatly hindered from mechanical obstruction.

Stiffness of the neck is a symptom more or less common to abscess in any of the spaces

I have mentioned, but it is especially notable in deep abscess along the carotid sheath. The neck may not be twisted or turned without great effort and pain and usually the patient turns his whole body when turning the neck would usually suffice. The writer has seen patients of this type who have been told they had rheumatism of the neck. In such instances the primary infection, the quinsy, the decayed tooth or possibly a mastoid suppuration, occurred several weeks previously and is now forgotten or overlooked. The cervical infection has been slow, the symptoms indefinite and hence when stiffness, hardness, and pain in the neck become severe, the physician may be at a loss to account for them.

The writer has seen deep abscess of the neck that had its origin in the mastoid process. Mastoid extirpation had been performed but pus had already ruptured through the tip and the deep structures of the neck had been involved. The mastoid might have healed but the neck had remained stiff and painful. Such behavior of the pus in the neck (the symptoms at no time having been violent or alarming) had been overlooked until general sepsis from the infection of a vein had taken place or respiratory difficulty from mechanical obstruction had become an alarming symptom. I emphasize these cases since abscess of the neck does not always present alarming symptoms at once and there may be periods when its presence is not easily detected, even by experienced surgeons.

Deep abscess of the neck occasionally follows curious and unexpected routes to the surface where it is discharged. The writer has in mind, especially his own and recorded instances, in which the abscess broke through the deep fascial planes and finally reached the space beneath the cartilage of the external ear, where it ruptured through and discharged into the outer auditory canal. Cures have been reported following this strange procedure.

Perforation of the esophagus is a not uncommon cause of abscess which finds its way to the carotid sheath. The perforation usually results from the passage through the gullet or the lodgment of some sharp object, as a spicula of bone, or from the passage of an esophagoscope or the necessary manipulations in the removal of such an object. It is obvious that in the withdrawal of jagged foreign bodies from the gullet the

wall of the esophagus may be seriously injured or penetrated, even by the most skillful manipulation.

Perforation leads to infection around the gullet and is usually followed by alarming symptoms. If the perforation is below the clavicle, the infection will, of course, be primary in the mediastinum.

Complications and disasters are not unknown as a result of deep abscess of the neck, and especially of the pharyngo-maxillary and pre-carotid spaces. The reason for such complications must be obvious when it is recalled that infection in these latter situations is in close proximity to the internal jugular vein and its tributaries, which are exposed to infection and thrombosis. Of the 100 abscesses reported by Shapiro, there were three of general septicemia, six of jugular thrombosis and one of fatal hemorrhage from the erosion of a large artery. Most surgeons have experienced one or more of these complications. The writer has had two cases of jugular thrombosis occurring in deep abscess of the neck and one case of fatal hemorrhage. During this month (June, 1935) a case of fatal hemorrhage occurred in the Riley Hospital at Indianapolis. The child had had his tonsils removed a month previously; abscess of the neck had followed and at postmortem a rupture of the internal carotid artery was observed. An aneurysmal sac, the point of rupture, lay in a bed of pus and partly organized tissue.

Several instances of fatal hemorrhage from deep abscess have been reported, one, a child, while being hurried to a hospital for treatment.

Edema of the glottis is another alarming complication and may prove rapidly fatal unless promptly relieved.

The almost universal experience among surgeons is that deep abscess of the neck is a dangerous affection unless dealt with promptly by surgical methods. Of course, it is never meant that surgical methods should be undertaken hastily or without rather positive information as to the location of the abscess. But when the affection has been located with reasonable certainty, most surgeons advise that the pus be promptly evacuated. Havens, in a recent article, is opposed to early surgery in deep abscess of the neck and bases his opposition on a study of 103 cases in the large clinic with

which he is connected. Early operation was not practiced but only one death occurred in his 103 cases. This is a better record than most surgeons can produce and is on that account entitled to great respect. Beck reports one death in twenty-four cases of deep abscess. Death, in both the case of Havens and that of Beck, followed jugular vein thrombosis. The percentage of deaths in Shapiro's reports is much higher and it will be noted that in all instances death followed a complication of the abscess.

The writer, in looking back over his experience with deep abscess of the neck, finds that a crisis had often been reached when the operation was performed and that to have awaited fluctuation or further development would have been unwise. Here, as elsewhere, the surgeon must use judgment, but if a deep abscess has been located, the writer feels that in most instances the life of the patient will be more secure if it is relieved by early surgical means.

In case of retropharyngeal abscess in which the diagnosis is made early and the abscess is seen to point in the upper midline of the pharynx, incision in this location is unquestionably the right procedure. To wait, in such instances, permits the abscess to descend in the neck, to obstruct breathing and, if the child survives long enough, to reach the root of the neck. And the same is true of many cases of pharyngo-maxillary abscess. Pus sometimes points on the lateral wall of the pharynx and may often be evacuated while yet in this situation. Since Ludwig's angina begins in the floor of the mouth, the abscess formation is often found pointing toward the buccal surface and can, in such event, be opened into the mouth. But if it be not opened in this situation, or if it does not break spontaneously, sagging of the abscess takes place and it must be opened later by external incision.

An adequate incision from the outside is indicated in all cases where the pus is deeply situated and where no pointing toward the mouth or pharynx can be found. And even when the abscess has been reached in the mouth, it is sometimes advisable to enter from the outside also, and to connect the two openings, since only in this way can the pocketing of the abscess in the neck be adequately drained.

In event the jugular or other veins become

infected or thrombosed, this complication will be announced by the type of fever which immediately comes on. It is of septic type and behaves exactly as does septic fever from other causes, the chief characteristics being chill followed by sudden rise of temperature to 104-5° F., a rapid fall, which is often followed by sweating and prostration. The rise and fall of temperature are repeated in cycles, usually until surgical relief or death occurs. But few spontaneous instances of cure have been recorded. Therefore, should the jugular vein become infected or thrombosed, it is conceded the best and safest practice is to ligate it at once and resect any portion which may be found thrombosed. Excellent results have followed this procedure.

In the event the abscess has broken from its original environment at the floor of the mouth

or in the pharyngo-maxillary fossa and is burrowing its way down the neck along the anterior portion of the carotid sheath, it has been the writer's practice to lay it open by a generous incision along the anterior border of the sternomastoid muscle. Blunt dissection is always employed where possible and the procedure is carried out entirely while working between the fascial planes. A free incision is essential to good inspection of the pathology which may be present, to insure greater ease of the necessary manipulations and to assure a quicker, safer and more thorough operation.

A good knowledge of the fascial planes of the neck, an early diagnosis, the choice of most suitable time for operation and the employment of modern technic in the surgery of deep abscess of the neck will greatly lower the former high mortality of this serious and painful affection.

THE IMPORTANCE OF RADIATION THERAPY INSTITUTIONS IN THE CONTROL OF CANCER*

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CLINICAL investigations in the early diagnosis and treatment of cancer have been and are of the greatest importance in the fight to control cancer. Laboratory researches have, so far, not been fruitful in the determination of the nature of cancer. The solution is bound up with the growth, differentiation and life cycle of normal cells, of which very little is known. Until this is known we can hope to learn little about the abnormal cancer cells.

Mortality statistics place cancer as the second highest cause of deaths. It is natural that the laity is much interested in cancer control and that the medical profession is more than ever endeavoring to attain it. Though the nature of cancer is not as yet known it is known that early diagnosis and immediate and adequate treatment would put us in control of the disease.

Your society has asked me to discuss the treatment of cancer, the organization of treatment centers and the recent developments of radiation therapy.

The treatment of cancer is surgical, radiological and medical or subjective and palliative.

Surgical methods of treatment comprise the standardized radical extensive operations whereby the tumor-bearing area is totally eradicated without leaving a single cancer cell behind. This eradication includes the primary growth, the regional lymph nodes and the intervening tissues. Dissection with the steel knife and the electrotome, including the electrocautery knife and the radio knife and the destruction with chemical agents, heat and diathermy, are all surgical measures. They are indicated if by their use all of the cancer cells can be removed. Otherwise the cancer is said to be inoperable. Inoperability depends on the extent of the growth, the location of the growth, the technical impossibility of removing the growth, and the surgical hazards or risks. It is certain that a growth clearly localized within the organ or tissue of primary origin is operable.

Treatment of cancer by radiation includes the use of radium and roentgen rays. It is indicated if the malignant growth can be tem-

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porarily or completely arrested by irradiations without danger to the adjacent normal tissues and organs. This statement implies: (1) the homogeneous application of an adequate radiation tissue dose to the entire growth, the regional lymph nodes and the intermediary tissues; (2) the normal tissues and organs lying within the radiation beams must not be irreparably damaged by the rays; and (3) the treatment must not be dangerous to the life of the patient.

Radiation therapy requires the investment of large amounts of money for radium, appliances for application, transformers and roentgen tubes and the proper housing. It is this question which you have asked me to discuss.

It is evident that the solution of this problem should be sought by the medical profession so it may remain in control of the treatment of cancer. The objective solution, also, should include arrangements for those patients who cannot pay for expensive treatment. The answer to the solution of the problem is therefore twofold: (1) the technical requirements for radiation therapy, and (2) the economic needs involved.

The basic requirement of radiation therapy is a homogeneous distribution of an adequate radiation dose throughout the tumor mass including the growth, the periphery, the regional lymph nodes and the intervening tissues, such as the lymph vessels, the connective and fatty tissues. An adequate radiation tissue dose should represent a known physical and biological quantum of rays. For instance, Quick et al. determined the dose for head, neck and mouth carcinomas to be ten threshold erythema doses or 6,000 r with backscatter applied with 200 Kv. roentgen rays. Lee et al. came to the conclusion that the tissue dose for breast carcinomas is ten to twelve threshold erythema doses of 6,000 to 7,200 r. Schmitz, Pfahler, and others found that the tissue dose for carcinomas of the cervix and corpus of the uterus was about 4.5 to 5 threshold erythema doses or 2,700 to 3,000 r with backscatter. Unless such massive doses are applied to the tumor mass and its extensions or metastases a carcinoma can not be permanently arrested.

There are three methods of applying radiations in deep and massive cancers: the interstitial, the cavitary and the distance methods.

The interstitial method implies the homogeneous implantation of radon gold filtered seeds or radium element platinum cell nests. If the growth is deep seated, operations of access must be performed; thus, the neck glands, the axillary glands, or deep-seated organs should be exposed by operative methods. After the seeds or nests have been implanted, then the skin is closed. Radium cells should be inserted in such a manner that they may be removed. Radon seeds may be left behind. It is obvious that the interstitial method is confined to surface tumors and accessible deeply located tumors.

The cavitary method means the insertion of radium element or radon tubes properly filtered with either 0.5 mm. platinum or 2 mm. brass and 1.5 mm. Para rubber into the tumor mass through natural body channels. The equal intensity curves of such capsules should be known. The cavitary method has been most successfully used in carcinomas of the cervix and the body of the uterus. As 7.5 r represent the physical dose measurement of 1 mg. radium element filtered with 0.5 platinum, applied for one hour at a distance of 1 cm., it follows that 50 mg. applied for one hour, filtered with 0.5 mm. platinum and 1.5 mm. Para rubber, attains at 1 cm. distance a dose of 375 r and within ninety-six hours 36,000 r or forty threshold erythema doses. At 2 cm. distance the dose has been reduced to 9,000 r, and at 3 cm. it is reduced to 4,000 r. As the radium capsule is applied in three intervals, eight days apart, for 3x32 hours, a loss in r must be applied, namely, 35 per cent. Hence, at 3 cm. distance, the dose applied in one sitting would be 2,424 r or four threshold skin doses. These r values are the equivalent of the r obtained with 300 Kv. roentgen rays.

The posterior bladder wall and the anterior rectal wall are about 2.5 to 3 cm. distant from the axis of the cervical canal. The normal mucous membranes of these organs can stand a radiation dose about 20 per cent higher than carcinoma tissue before any permanent and destructive effects are attained. If the bladder and rectum are kept empty, if firm packing is employed to push the bladder and rectum away from the capsule and if palisading or interstitial insertion of radon seeds or radium nests in the paracervical tissues and vaginal contact applications of radium against the cervix as done

in the Regaud method are avoided, then injuries to these organs, such as vesico-vaginal and recto-vaginal fistulae are prevented.

Should one decide to use cavitary radiations in carcinomas of the vagina or rectum, then phantoms of inert material as bakelite should be constructed, having a transverse diameter of 3 cm. in which the radium capsule is placed. Then the same radium doses may be used as found adequate in uterine carcinomas. Otherwise cavitary methods of radiation should not be used.

Distance irradiation means the application of a radiation at a predetermined distance from the body surface. Thereby deep-seated carcinomas may be more homogeneously permeated with rays. Using cross-firing through two or more fields, the summation of the depth doses of the number of fields used will give an idea of the total depth dose attained. Radium cannons are applied at distances of 6, 10, and rarely 15 cm. The deep dose at 10 cm. beneath the body surface and at a focus skin distance of 6 cm. is 9 per cent of the surface dose; at a focus skin distance of 10 cm., it is 23 per cent of the surface dose; at a focus skin distance of 15 cm., it is 31 per cent of a surface dose; and at a focus skin distance of 50 cm., it is 61 per cent of the surface dose. However, similar measurements for roentgen rays show that the deep dose at 10 cm. is 46 per cent of the surface dose with 200 Kv. roentgen at a focus skin distance of 75 cm. and a filter of 1.0 mm. copper plus 1.0 mm. aluminum; and 56 per cent with 800 K.V. roentgen at a focus skin distance of 70 cm. and a filter of 1.5 cm. water, 2.0 mm. brass, 2.0 mm. aluminum, 2 mm. lead, 2 mm. copper and 5 mm. bakelite.

The time required to apply a tolerance skin dose may be read from the accompanying table.

Let us assume that a radium applicator containing 4 grams of radium element was used. Then an application to one field of 10 cm. diameter at 6 cm. focus skin distance would require 30:4 or seven and one-half hours; at a focus skin distance of 10 cm. it would require 60:4 or fifteen hours; at a focus skin distance of 15 cm., 100:4 or twenty-five hours; and at a focus skin distance of 50 cm., 300:4 or seventy-five hours. However, crossfiring should be used; hence the time duration of a complete treatment through two fields must be doubled, through three fields tripled, and so on. If a radium applicator containing 4 grams of radium element were used continuously without interruption day and night, weekdays and holidays, then 171 patients a year could be treated at a focus skin distance of 15 cm., as the year has 357 days of twenty-four hours or 8,565 hours, and 8,565 hours divided by 50, the time duration for two fields, equals 171.

There are on an average 300,000 patients in our country suffering from cancer. As the average duration of life of such patients is about two years, it follows that about 150,000 new patients are seen yearly. It is fair to estimate that about 30,000 of these are permanently cured by some method of radical surgery, and that about 30,000 are too far advanced to offer any hope from treatment. Then 90,000 patients remain who should be treated with radiations. Let us further assume that about 15,000 of these patients could be treated with the interstitial and cavitary methods of irradiation; then 75,000 patients remain requiring distant radiation therapy. As 170 patients can be treated yearly with a 4 gram radium element cannon over two fields at 15 cm. focus skin distance it follows that about 440 stations each supplied with 4 grams of radium

Radiation	Filter	Focus Skin Distance	Time		Ten fraction application
			Deep Dose at 10 cm.	Single gram hours	
Gamma rays obtained from a grm. el. pack	4.0 mm. Platinum	6	9	24	10x3 gram hrs.
	1.5 mm. Brass	10	23	40	10x6 gram hrs.
		15	31	60	10x10 gram hrs.
		50	61	200	10x30 gram hrs.
Roentgen 200 Kv. at 25 Ma.	1.0 mm. Cu.	75	46*	1,370 r	10x200 r
	1.0 mm. Al.				
Roentgen 800 Kv. at 10 Ma.	1.5 cm. Water	70	56	2,000 r	10x280 r
	2.0 mm. Brass				
	2.0 mm. Aluminum				
	2.0 mm. Lead				
	2.0 mm. Copper				
	5.0 mm. Bakelite				

element would be necessary, in the United States alone, to give every patient needing distant radiation therapy an opportunity to avail himself of every possibility in the treatment of carcinoma. The expense of 440 such stations would be 88,000,000 dollars, not counting the housing and the expensive machinery to suspend and operate the heavy lead housing. To save time and also expense of attendants, stations could be equipped with 20 or 24 grams radium element and then eighty-eight or sixty-four stations should be distributed through the country in proportion to population per square mile.

Similar reasoning applied to 800,000 volt roentgen installations would give the following results: If it is run for eight actual working hours for five days a week, then forty treatment hours would be attained weekly or 2,080 hours yearly. Using the fraction method of ten treatments to each of two fields it would require 160 minutes, or in round numbers about three hours, for each patient or 360 patients a year if the treatment factors are used as given in a preceding paragraph. However, the apparatus could be used in two shifts or the ampere load could be increased from ten to twenty milliamperes. In other words, the output would be doubled and 720 patients could be treated yearly. It means that 104 roentgen stations could meet all the requirements of distant radiation therapy in our country. An installation of this kind, including buildings, would cost 50,000 to 60,000 dollars. Hence the total outlay for the entire nation would be 5,200,000 to 6,240,000 dollars.

The population of our country is about 130,000,000. If this number is divided by 720, the number of cancer patients requiring distant radiation therapy per station, then it follows that for each 1,800,000 people a radiation institute would be desirable. It would be uneconomical to install more institutions than needed. This is a very important matter, as it concerns, chiefly, the medical profession, which probably will bear or provide the money. If physicians desire to keep the treatment of cancer under their control, then they must find the most economic ways of accomplishing this solution. We should move slowly but positively. Perhaps a 500,000 volt roentgen may suffice to do the work and then a great saving in money would result. Fortunately, apparatus to deliver 400 to 500 Kv. roentgen rays have also been installed in several cities.

The medical men in charge of such institutions should serve the patients and the medical profession, and their sole means of remuneration should come from the institutes. They must never become competitors of the profession by doing private work.

The discussion has considered the motives that led my group to do and plan some of the pioneer work in the treatment of cancer. The solution also included a study of the most economic and effective methods of applying radiations. If the presentation will aid you in solving this problem efficiently and adequately for your state, I shall feel very happy at having been your guest.

DEVELOPMENT AND TREATMENT OF CANCER OF THE STOMACH*

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THE results of surgical treatment of localized cancer of the stomach have been excellent. When in a group of 1,000 such cases, 50 per cent of the patients are living and well after three years, the value of early recognition of the presence of such lesions is evident. When skillful roentgenologists are able to demonstrate the

presence of gastric lesions as small as 1 cm. in diameter, and in many such cases to designate whether the lesion is benign or malignant, the roentgenologic method of examination is the outstanding contribution to the early recognition of gastric lesions. Although there is a certain percentage of error in the roentgenographic identification of the type of gastric lesion present, and likewise at operation distinction between

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small benign and small malignant lesions is frequently uncertain until microscopic examination has been made, it is proper to regard all gastric lesions as malignant until they are proved to be otherwise.

The lesions concerning which error most frequently may arise are the small, ulcerating ones, and infrequently the gastric polyp. As a basis of comparison, if such lesions are malignant, they might be classified as "developmental" carcinomas, whereas more extensive, infiltrating lesions, which have no ulcerative features, might be considered to compose a group of "original" carcinomas. The saddest feature of many original carcinomas of the stomach is their symptomless rapidity of growth; they may fail to manifest their presence until symptoms of obstruction have occurred, or until extension of the lesion to adjacent structures produces abdominal pain. It is probable that this type of lesion can be recognized early only by frequent, routine, fluoroscopic and roentgenographic examinations of the stomach, and I should like to suggest that all patients, who are more than forty years of age, should, at the time of their periodic health examinations, be subjected to fluoroscopic examination of the stomach and roentgenographic examination of the colon, particularly if the patients complain of persistent dyspeptic discomfort.

It is worth while remembering that malignant lesions occur much more frequently in the stomach than in any other part of the gastro-intestinal tract and that they occur there three times more frequently among men than among women. Although statistics and experimental studies of cancer might lead to the assumption that cancer is not hereditary, yet I think all physicians have been impressed by the frequency with which patients who do have cancer have known of other members of their families having had malignant lesions also. It would appear, therefore, that people who have such hereditary tendencies should be subjected to the most painstaking search for malignant lesions at the time of their periodic health examinations. Fortunately, most patients who have cancer of the stomach do have symptoms which should lead the physician to suspect the possibility of the presence of abnormal gastric physiologic processes.

It is particularly interesting and noteworthy

that a great many patients, who are found, on roentgenologic examination, to have cancers of the stomach, have been treated medically for many months on the basis of a clinical diagnosis of peptic ulcer, because of similarity of symptoms to those of peptic ulcer, and, in most such cases, the medical treatment has been instituted and carried out without fluoroscopic or roentgenographic examination of the stomach. The corollary of this is obvious; namely, that a patient who has symptoms of dyspepsia, no matter how closely they resemble the clinical syndrome of benign peptic ulcer, should not be treated medically without fluoroscopic examination to confirm the diagnosis, and even then, if the lesion is reported to be a gastric ulcer, the possibility, indeed the probability, of it being malignant should lead to immediate surgical consultation. I believe the statement is justified that the report of a malignant lesion of the stomach, made by a competent roentgenologist, is almost certain to be accurate, but that the report of a gastric ulcer made by a roentgenologist, or even by a surgeon who actually sees and feels the lesion at the time of operation, does not exclude the possibility that the lesion may be carcinomatous. Several years ago McVicar called attention to the fact that an ulcerating lesion of the stomach, which disappeared following a course of medical treatment, could not always be assumed to be benign, for he found that many patients who had ulcerating lesions of the stomach might respond temporarily to medical treatment, even when the process was malignant. To consider such disappearance of a lesion as a criterion that it is benign may cause delay in attacking the lesion surgically, and it may allow an operable lesion to proceed to inoperability. There is no doubt that medical treatment of many benign gastric ulcers, by internists skilled in treatment of gastro-intestinal disease, is worthy of trial for certain types of gastric ulcer, particularly when the condition is acute and the patient is young, or when the patient is elderly and constitutes a poor surgical risk. This treatment should be attempted only when the patient can be kept under observation for several months. It should be emphasized that the decision to treat such a person by medical measures carries great responsibility, for, if the lesion is malignant, by the time it has been found to respond unsatisfactorily to medical treatment,

sufficient time may have elapsed for it to have become unremovable. I vividly recall one patient who had a gastric ulcer and who was being treated medically. Pain was relieved, blood disappeared from the stools, and the niche disappeared on roentgenologic examination. Ten months later, however, symptoms reappeared. The roentgenogram revealed the lesion, exploration was made, and an extensive, inoperable malignant lesion was found, from which the patient died a few months later.

Gastric polyps, like polyps of the colon, are usually malignant. Their presence is usually associated with absence of free hydrochloric acid from the gastric secretion, and frequently they bleed to the extent that a mistaken diagnosis of pernicious anemia has been made and treatment carried out without roentgenologic examination of the stomach having been made. In cases of marked anemia seen at the clinic, even though apparently of the primary type, fluoroscopic and roentgenographic examinations of the stomach are routine procedures in examination, and the number of patients who have had bleeding gastric polyps has been surprising. When such polyps have been removed, specimens from various portions of them, from the periphery as well as the stalk, should be carefully examined microscopically. In many seemingly benign gastric polyps which have been removed at the clinic, peripheral secondary cytoplasia has been found.

The Development of Cancer of the Stomach

Secondary cytoplasia* might be defined as that change in cellular constituents of an abnormal lesion which would appear to be the intermediary stage between benign and malignant reactions. In this respect, the abnormal increase in the size of the nuclei of such cells would seem to be of great importance, as has been reported by MacCarty, Haumeder and Berkson, and Raaf. Recently the last-named investigator, working in The Mayo Foundation, has made studies of secondary cytoplasia in 120 cases of gastric ulcer, in eighty-seven cases of duodenal ulcer, and in twenty-two cases of duodenitis. As controls, thirty-four specimens of normal gastric mucosa were studied. There were atypical, hyperplastic cells in the mucosa bordering ap-

proximately 20 per cent of the seemingly benign gastric ulcers, and it was concluded that gastric cancer cells and atypical hyperplastic cells* in a gastric ulcer are morphologically indistinguishable. In specimens of early cancer on ulcer, atypical hyperplastic cells were found in the gastric mucosa adjacent to the cancer. The occurrence of this atypical hyperplasia in ulcerating lesions paralleled the age incidence and the sex distribution as well as the duration of symptoms similar to proved cancer on ulcer. This study would seem to add weight to the conclusion that lesions in which there is atypical hyperplasia are early cancerous ulcers and that when they are encountered a mistaken diagnosis of a benign ulcerating gastric lesion may be made because of failure to examine all quadrants of the ulcer microscopically.

The Treatment of Carcinomatous Lesions of the Stomach

There is no necessity to uphold the statement that the proper treatment for carcinoma of the stomach is surgical removal whenever possible. It is proper, I believe, to advance further and to say that every patient who has cancer of the stomach, regardless of how extensive, should be allowed the benefit of surgical exploration of the lesion providing distant metastasis is not demonstrable. In a group of 170 patients operated on at the clinic in 1933, for cancer of the stomach, the lesions of sixty-nine patients were removed by partial or total gastrectomy. In thirty-seven of these cases the carcinoma, by fluoroscopic and roentgenographic examination, appeared to be very extensive, and such examinations seemed to indicate that the lesion was of doubtful operability or wholly inoperable. Yet, in 50 per cent of these thirty-seven cases, the lesion was removed successfully.⁸ I would estimate that in 10 to 15 per cent of those cases in which the lesion, on roentgenologic examination, would appear to be inoperable because of its extent, surgical removal of the lesion can be accomplished. Large malignant lesions of the stomach will often be found to be of low degree of malignancy, to be sharply demarcated, and to present no involvement of lymph nodes. Removal of such lesions by partial gastrectomy gives a high incidence of permanent cure and this is particularly true in cases in which the patients are elderly.^{6, 9} In general, I believe that

*The terms secondary cytoplasia and atypical hyperplasia of cells are synonymous.

an increasing number of malignant lesions of the stomach are being removed, for in 1934 in 231 cases of carcinoma of the stomach operated on at The Mayo Clinic the lesion was removed in 101 by partial, subtotal or total gastrectomy. The finding of an extensive carcinoma, localized in the stomach, or even of one associated with involvement of lymph nodes, is viewed from the standpoint that unless the lesion is removed the patient is doomed to early death. Balfour has shown that when the disease is confined to the stomach, 50 per cent of the patients who have carcinoma of the stomach which has been removed by partial gastrectomy, have lived for three years or longer, and that even when extra-gastric involvement has taken place, 19 per cent of the patients have lived three years or more following resection.

In several cases total gastrectomy^{5,6,7} has been performed successfully at the clinic, and patients have lived and been comfortable two and three years subsequently. That such an operative procedure can be carried out in suitable cases with great benefit to the patient has led to the impression that all gastric lesions should be removed unless they have invaded adjacent structures to the extent that the carcinomatous process cannot be removed in its entirety. At operation, in many instances in which the lesion at first would appear not to be susceptible of removal because of its extent and attachment to the mesocolon and to the capsule of the pancreas or liver, it is found that, after freeing of adhesions and separating the lesion from these structures, the growth is readily removable. In other cases, particularly if the tumor is large, the uninvolved portion of the stomach may be thickened to give the appearance of involvement, yet the thickening may be only the result of gastritis adjacent to the lesion. It is not an uncommon experience to find that a growth which is examined while the patient is straining under light anesthesia appears to be unremovable, but under deep anesthesia may be seen to be readily removable. In several cases involvement of the transverse mesocolon has given, at first, the appearance of inoperability, yet it usually is the avascular portion of the mesocolon that is involved, and this portion can be removed with the carcinoma, without interfering with the blood supply of the colon.

The Influence of Age on Operative Risk

I believe it is worth while emphasizing to patients who are in the sixth, seventh or even eighth decades of life that they frequently stand operative procedures of great magnitude as well as younger individuals. In one of the two cases in which I have successfully performed total gastrectomy for carcinoma, the patient was a man sixty-nine years of age, and he was living and well two years later. Two years ago I performed subtotal gastrectomy on a patient who was eighty years of age, and he has been free of recurrence since that time. I recall many cases in which patients in the sixth and seventh decades of life were operated on successfully, and in which extensive gastric resections were carried out successfully with a risk no greater than that attending resections of average extent among much younger patients. A corollary of this is that it is not the age of the patient but his general condition that is a factor in the surgical mortality.

Technical Procedures Assisting in the Removal

I have found it of value to approach all extensive lesions of the stomach through a left rectus incision, as suggested by Balfour. Such an approach enables the surgeon to attack the upper part of the stomach with much greater ease than through an incision in the median line. Resection is begun by dividing the duodenum just below the pyloric sphincter and by reflecting the stomach upward, removing all of the gastrohepatic omentum and as much of the gastrocolic omentum as may be indicated to a point well above the lesion. If it is desired to perform a Polya type of anastomosis, the jejunum is sutured to the posterior wall of the stomach at this high level before the growth is removed; this enables the surgeon to remove a large part of the stomach, or even the entire stomach when necessary, with greater ease and safety than by removing the lesion first, using a crushing clamp to close temporarily the proximal end of the stomach. Among fleshy individuals particularly, removal of all the gastrocolic omentum to the site of resection assists materially in the ease with which reconstruction anastomosis can be carried out and, at the same time,

more completely removes any involved lymph nodes along the greater curvature.

In general, a posterior Polya, or an anterior Polya-Balfour, type of anastomosis is the most satisfactory type of reconstruction following extensive gastric resection for malignant disease. However, in certain instances I have found that the original method of Billroth, in which the stomach and duodenum are anastomosed, has worked out to advantage, although the greatest field of its applicability is in the presence of benign gastric ulcers, bleeding duodenal ulcers, and recurring ulcers. This particularly is true of small lesions localized high on the lesser curvature of the stomach, removal of which can readily be effected by excising a large portion of the lesser curvature and its omentum. By preserving a large amount of the greater curvature of the stomach, direct anastomosis with the duodenum can be accomplished in less time than is required for the Polya anastomosis, and there is one less area for suturing. When extensive gastric resections have been performed on elderly patients, particularly in the case of subtotal or total gastrectomy, jejunostomy as a means of providing a temporary method of feeding has a decided advantage, for nourishment can be administered directly into the jejunum, through a tube, for as long a time as necessary; during this time oral administration of fluids is restricted, to assist in healing of the anastomosis. This is of particular value for patients who have lost a considerable amount of weight and who have been debilitated as a result of carcinomatous obstruction.

Summary

The presence of abnormal gastric lesions as small as 1 to 1.5 cm. in diameter can be detected by a competent roentgenologist. Many small lesions of the stomach, which appear to be benign on roentgenologic examination, and even at the

time of operation, have proved, microscopically, to be malignant. Recent work by Raaf, of The Mayo Foundation, disclosed a definite type of cell, with an unusually large nucleus, which appears to be an intermediary stage between the cells of benign and malignant ulcerating lesions. Such cells have been described by MacCarty and Raaf as showing "secondary hyperplasia" or "atypical hyperplasia."

In view of the successful removal of the entire stomach in certain cases, as well as in cases in which successful subtotal gastrectomy has been performed for malignant lesions, it is reasonable to assume that most malignant lesions localized in the stomach should be removable. Fifty per cent of the patients from whom localized lesions of the stomach have been removed have been found to be living three years or longer after partial gastrectomy. Regardless of the extent of a lesion of the stomach in roentgenologic examination, in the absence of demonstrable metastasis, the patient's general condition permitting, exploration of the lesion should be carried out. Of thirty-seven cases reported by the roentgenologist as being of border-line operability or inoperable, in eighteen, or 50 per cent, the lesion was successfully removed.

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STERILITY: A CONSIDERATION OF ITS ETIOLOGY AND TREATMENT*

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THE recent changes in our concept of the problem of sterility are worthy of consideration. The older concept usually placed the blame of a sterile union upon the wife. Most often she was believed to have a stenosed cervix and an unhealthy endometrium. Not infrequently her vaginal secretions were thought to be so strongly acid that they destroyed the invading spermatozoa. When a retroverted uterus was discovered, it was believed to prevent conception mechanically. Her general poor health frequently was blamed for her barrenness. The most common treatment was a dilatation and curettage to provide unobstructed passage for advancing spermatozoa and a healthy bed for the fertilized ovum. Alkaline douches often were advised to counteract hostile vaginal secretions. Tonics usually were prescribed to improve her health. Frequently, the "tipped uterus" was "straightened" by an operative procedure. After such empiric treatment, patient and physician waited on time and circumstance and hoped for the best.

The modern concept of sterility recognizes that either husband or wife may be responsible for childlessness. It acknowledges that frequently both of them are of low fertility. It admits that usually there are multiple causes, instead of a single cause, for almost every sterile union.¹⁵ Thus increasing knowledge of the multiple factors involved leads to a more complete investigation of both partners.⁸ Treatment then is directed along more intelligent lines.

More careful study, on the other hand may lead to the discovery of such absolute barriers to conception as azoöspemia in the male, or closure of the interstitial portions of the fallopian tubes in the female and point out the hopelessness of treatment in such cases.

Male Factors in Sterility

The wife is the partner of an infertile union who usually consults the physician. A careful search will be made, consequently, for female

causes of sterility, but when one realizes that in 30 per cent of sterile unions the husband produces an inadequate semen, one will not neglect the two tests necessary to prove his virility before proceeding to more complicated investigations and to unnecessary therapeutic measures for the wife.

The examination of a condom specimen of semen one or two hours old, kept at body temperature after ejaculation, will yield valuable information. The quantity of a normal specimen should be 4 c.c. or more. A drop of semen on a warm slide should show a preponderance of motile spermatozoa under the microscope. A spermatozoa count, made as one counts leukocytes, but using normal saline solution as a diluent should number from 70,000,000 to 200,000,000 spermatozoa per c.c.⁴ A drop of semen mixed with a drop of hematoxylin and examined for variations in morphology should reveal less than 20 per cent of abnormal spermatozoa. Abnormality may be judged by the size of sperm heads, which may be too large or too small, by the deformity of sperm heads, and by the deformity, duplication or absence of tails. The finding of numerous pus cells in a condom specimen will indicate a chronic lower genito-urinary infection of gonorrheal or other origin which may be the primary cause of lowered fertility.

Post-coital examination after Hühner's method should supplement examination of a condom specimen. For this test the wife will be asked to report to the physician one or two hours after coitus. Specimens are obtained from the vaginal pool and from the cervical canal by suction with a rubber bulb attached to a pipette introduced into the vagina through a Graves speculum. Microscopic examinations of both specimens are made. A normal vaginal specimen may or may not reveal motile spermatozoa. A normal cervical specimen will show many active spermatozoa. When the condom specimen has shown abnormalities, the finding of a preponderance of dead spermatozoa in the cervical specimen will confirm the diagnosis of lowered male fertility. When, however, the condom specimen has been

*Read at the meeting of the Northern Minnesota Medical Association, August 12, 1935, Duluth, Minnesota.

normal and the post-coital specimen from the cervix abnormal, a search must be made for causes of hostile cervical secretions in the female.

Subnormal fertility in the male as discovered by the two tests just described may be due to a residual prostatitis and vesiculitis following gonorrhea. It may be due to focal infections or chronic intoxications. Not infrequently it is due to endocrine disturbances with or without an associated low basal metabolic rate.

Female Factors in Sterility

A consideration of the female causes of sterility presents a more complex problem. By far the greatest number of sterile women owe their plight to the effects of acute and chronic infections involving the fallopian tubes and/or the cervix. Some of them will have had acute appendicitis; others will have had induced abortions;¹⁶ the largest number of them will have had gonorrhea. Polak's observation that 90 per cent of women who do not conceive are married to men who have had gonorrhea at one time or another is startling and significant. The statement does not imply that all these women are sterile because of gonorrheal infection. It does emphasize the importance, however, of searching for other causative factors in the 50 to 70 per cent of cases in which the sterilizing effects of gonorrhea are not demonstrable.

Cervical infections of gonorrheal or other origin will usually be revealed by speculum examination of the cervix. Endocervicitis and cervicitis are characteristic in appearance. Sometimes, however, an innocent appearing, small external os will exude purulent mucus when it is dilated and the spacious cervical canal behind it is probed. Such hidden infections of the endocervix are commoner than one would suspect. The hostile secretions resulting from a diseased endocervix usually account for the dead spermatozoa found on post-coital examination when a condom specimen has indicated normal male fertility.

In addition to gonorrhea, cervical injuries from such operative procedures as induced abortion, therapeutic dilatation and curettage and the crippling Dudley wedge-shaped excision of a portion of the posterior lip of the cervix, formerly done for dysmenorrhea, are important

causes of endocervicitis bearing on a subsequent sterility.

In the absence of demonstrable cervical infection, or after it has been remedied, tubal integrity may be investigated by transuterine insufflation, using some method similar to that first devised by Rubin. A simple apparatus for this test consists of two parts: (1) a metal cannula with a curved, fenestrated tip over which a canalized rubber "acorn" has been slipped to block the external os; (2) an attached tubular Y-shaped metal connection, one branch of which is connected to a manometer, the other to a rubber bulb from which air is to be forced into the uterine cavity. During the test, the patient will complain of pain when traction is made on the anterior cervical lip and counter-traction on the rubber "acorn" by means of single-toothed tenacula. She will have abdominal cramps when air is injected under pressure. In spite of these discomforts, most patients will submit to the test in the office. A few nervous patients will require gas anesthesia for the procedure.

Varying degrees of tubal patency will be evident from the following observations made during a Rubin test:

1. There will be a sudden fall of pressure after the manometer reading has risen to from 40 to 200 mm. of mercury. This change is due to air passing into the abdominal cavity.

2. Bubbling sounds will be heard through a Bowles stethoscope, the bell of which has been placed over the lower abdomen. Such sounds are attributed to air passing through the fimbriated ends of the tubes.

3. Pain in the shoulder will be complained of after completing the test. This pain is due to the injected air in the abdominal cavity rising to the diaphragm as the patient sits up. It is usually felt in the right shoulder and may be intensified by having the patient breathe deeply.

4. Finally, when the physician is in doubt, a clear space of air beneath the diaphragm, present when the patient is in an upright position, may be demonstrated fluoroscopically or on an x-ray film.

A Rubin test which seemingly shows non-patency may be due to tubal spasm. This condition can be ruled out by repeating the procedure after giving the patient atropine or belladonna. A repeated Rubin test which reveals

non-patency may be supplemented by the visual evidence of radiographs of the uterus and tubes taken after they have been injected with iodized oil. Such localization of tubal stenosis should surely be done if a corrective operation is contemplated.⁵

Chronic pelvic congestion is a less common factor in sterility. Nevertheless it is sometimes important. It may have a functional basis and be the result of sexual maladjustments such as sexual excesses, deprivation or incomplete orgasm of the wife. More commonly, however, it has a pathological basis. Malpositions of the uterus *per se* do not cause it. But the sterile patient with a retroverted, hypermobile, boggy uterus who complains of backache, of bearing-down pains before menstruation and of leukorrhea will frequently have cystic, thick-capsuled ovaries interfering with ovulation and therefore will be sterile.

Endometriosis is an occasional factor in sterility. It also produces pelvic congestion with its attending symptoms. In addition, it produces a peritoneal irritation with resulting adhesions which mechanically interfere with fertility.

Of the pelvic tumors, myomata of the uterus are the ones most commonly associated with sterility. Although the relationship is not well understood, probably 30 per cent of women with myomatous uteri are sterile. In some of them sterility may be due to mechanical obstruction by submucous growths. In others, the frequent association of cystic ovaries with myomata may be the important factor in lowering fertility.

Our rapidly advancing knowledge of endocrinology indicates that as many as one-fourth of sterile marriages present functional factors as causes.¹ There is a group of women whose genital organs have failed to develop adult characteristics under the stimulus of puberty. These women have poorly differentiated labia minora and rather sparse genital hair. Their vaginas are short and sometimes narrowed toward the fornices. Their cervixes are long and pointed or they may be small, round and button-like. Acute antelexion of the uterus with a shortened anterior vaginal wall or retroversion is usually present. The uterine index, as determined by introducing a graduated sound into the uterine cavity and comparing the lengths of the cervix and the body of the uterus, shows a ratio nearer

that of a child, which is 2 to 1, than of a mature woman, which is 1 to 2.^{7,9}

From an endocrine point of view, women with faulty genital development belong in two classes: (1) those having primary pituitary deficiencies; (2) those having primary ovarian deficiencies. The former class is identified by such additional stigmata as girdle obesity and excessive hairiness including male distribution of pubic hair. Examination of their blood usually shows prolactin to be absent. Ovarian function is suppressed with oligomenorrhea and amenorrhea resulting.

Women in the class having primary ovarian deficiencies also show genital hypoplasia but are otherwise highly feminine in their physical development. They have full breasts, broad hips and a female distribution of pubic hair. The normal amount of prolactin is usually present in their blood. They have menstrual disturbances similar to those noted in pituitary deficiency.

There are a few women with ovarian deficiency who menstruate normally or somewhat profusely but do not ovulate. Novak has observed that this anovulatory type of menstruation so common in monkeys also occurs in women.^{11,12} These women are sterile because they do not give off ova for fertilization. Furthermore, with no corpora lutea being formed, no progesterin will be produced and the secretory type of endometrium normally developed just before menstruation and so necessary for implantation will not be present. Microscopic examination of bits of endometrium removed with a small curette premenstrually will reveal the deficiency and lead to the diagnosis.

Hypothyroidism accounts for another group of women with endocrine deficiency resulting in sterility.³ Women in this group usually have normally developed genitalia and normal secondary sex characteristics. They usually have dry hair and skin; they are sensitive to cold; they tire easily. They often have menstrual disturbances characterized by alternating amenorrhea and menorrhagia. Sometimes none of these signs or symptoms are marked enough to attract attention until a metabolic test reveals a lowered basal rate.

Treatment

After all possible etiological factors have been discovered and evaluated, treatment will be directed specifically toward each.

When chronic prostatitis and vesiculitis are discovered in the husband, a course of prostatic massage should be given.¹⁴ Foci of infection should be removed and sources of chronic intoxication such as alcohol and tobacco should be eliminated. The administration of desiccated thyroid orally is helpful in improving deficient semen but the administration of other endocrine preparations has been thus far disappointing.²

In dealing with the female factors of sterility, more specific measures are available. Treatment of endocervicitis in the wife yields the best results, and treatment of non-patent fallopian tubes, the poorest. Judicious linear cauterization of lacerated cervixes and infected cervical canals will restore most of them to normal with slight danger of subsequent stenosis. A few badly lacerated cervixes will require plastic operations; the occasional type of infected cervix presenting a "pin-hole" external os may require incision of the posterior lip or lateral incisions to facilitate drainage. This minor operation often can be done with a cautery tip in the office.

When fallopian tubes are totally blocked by previous inflammation, treatment is usually hopeless. Repeated insufflations of air with a pressure never exceeding 200 mm. of mercury may break down light adhesions in a few cases and reestablish patency. Those rare cases in which the injection of iodized oil has shown the obstruction to be at the fimbriated ends are frequently amenable to operative intervention.

Chronic pelvic congestion occasionally subsides when a retroverted uterus is corrected bimanually and held in place with a pessary but more often operative correction is necessary. The uterus should be suspended by some simple procedure such as Olshausen's operation. Cysts of the ovaries should be ruptured or resected as indicated.

When pelvic endometriosis is the cause of sterility, operative procedures will usually be more radical and the outlook for fertility poorer. When myomata of the uterus are sterility factors, myomectomies and the operative treatment of associated pelvic disease are indicated.

The treatment of endocrine factors in sterility is still in an experimental state but offers great possibilities for the near future. Theoretically, repeated stimulation with preparations of prolactin in the hypopituitary group, and with progesterin and estrin in the ovarian group should

affect low fertility favorably. Practically, only thyroid medication in the hypothyroid group, and sometimes in the other groups showing a lowered basal metabolic rate, has been encouraging.^{3,13}

Some favorable effects in endocrine deficiencies have been reported by using small, repeated stimulating doses of x-rays (usually as small as one-tenth of an erythema dose) to the ovaries, the pituitary gland and sometimes to the thyroid gland.^{6,10}

Cases in which no causes for sterility can be found are not hopeless.⁵ As many as one-third of these matings will become fruitful when general instructions as to hygiene and diet are followed. These instructions should include such measures as periods of continence with coitus limited to the fertile period of the menstrual cycle;¹¹ psychic stimulation by encouraging both husband and wife to study the physical and emotional aspects of their mating; sufficient rest and exercise; and the ingestion of a diet high in proteins, mineral salts and vitamins, particularly vitamin E. Regulation of diet frequently will include the problem of treating an unfavorable obesity.

The search for etiological factors and the treatment of sterility are often tedious and discouraging. But when one realizes that a better understanding of the problem has increased cures from 13 per cent to from 30 to 50 per cent in cases not showing absolute barriers to conception, it becomes a problem well worthy of our attention.

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STILLBIRTHS*

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DELEE in his book on Obstetrics makes this statement: "Ideal obstetrics demand that every child not congenitally deformed be delivered alive and absolutely uninjured." This ideal is far from being realized.

In 1877 Dr. Schultz estimated that 5 per cent of children are stillborn and 1.5 per cent die shortly after labor as a result of trauma. Fifty years ago there were no prenatal clinics. The laity knew very little about focal infections, toxemias, etc., and the majority of women were attended at best by a midwife, seldom by a doctor. Under these circumstances, we might reasonably expect a high fetal and neonatal mortality rate. During the past twenty-five years prenatal clinics have been established in all the larger cities, city and county nurses employed, and child welfare societies have been instrumental in disseminating a great deal of valuable information to the expectant mother.

These various activities have, no doubt, had some effect in reducing the neonatal death rate, but if we can rely on statistics, our stillbirth rate remains the same, and, I believe, if an accurate count could be made, is rather increasing, and is a problem of greater magnitude than that of neonatal deaths. It is rather difficult to arrive at a true estimate of the stillbirth rate, due to the fact that registration has not been complete in all the States, and the definition of stillbirth is rather vague.

Dr. Lyon of New York classifies as stillbirths all those cases in which the baby never breathed, even though the heart continued to beat after birth, and in which the delivery occurred between the twenty-sixth week of pregnancy and term. This definition would greatly reduce the

stillbirth rate, but why leave out the fetus born dead before the twenty-sixth week?

Figures available from the U. S. Public Health Service in 1928 give 89,765 stillbirths reported in the birth registration area. Since this area includes only about 94.9 per cent of the country, and since it is a well-known fact that all stillbirths are not reported, it is safe to assume that at least 100,000 children in the United States were stillborn in that year. This is a tremendous loss and makes us wonder why, with the great advances in other fields of medicine, we have not been able to reduce this fetal mortality rate.

Complications of labor, toxemias of pregnancy and syphilis are cited as the most common causes of stillbirths.

It is not the purpose of this paper to give in detail the causes of stillbirths, but to call your attention to a few factors which, for self-evident reasons, would not be published in the vital statistics: haste, "convenience," operative deliveries, and our changed social and economic condition. The use of numerous analgesic and oxytocic agents for a painless and short labor has been widely advertised both in the lay and medical literature, and as a direct result led to an indiscriminate use of drugs and forceps by many obstetricians.

A statistical study of births in Iowa by Drs. Plass and Alvis is illustrative of this. They have completed a study of 129,539 births with special reference to the method of delivery and the stillbirth rate. According to their findings, the stillbirth rate is arranged in a descending order as follows: (1) Urban hospitals; (2) rural homes; (3) urban homes; (4) rural hospitals.

The operative delivery among 89,270 live births was 11.2 per cent, while among stillbirths it was

*From the Mankato Clinic, Mankato, Minnesota. Read before the meeting of the Southern Minnesota Medical Association, Austin, Minnesota, August 26, 1935.

35.1 per cent. This relatively high operative incidence for the entire group would indicate that many "convenience" operations were performed. In this report premature children account for 43.9 per cent, while the stillbirth rate among full-term babies increases in proportion to the operative incidence, and on this account it is highest in the urban hospitals where operative intervention is more often resorted to. We must bear in mind, of course, that urban hospitals admit more abnormal cases and keep more accurate records.

Dr. Porter of Albany, N. Y., has written an article on "The Prevalent Hour of Stillbirths," and he found that most of the stillbirths occurred during the day, the maximum falling between the hours of 3:00-6:00 P. M., and the minimum between 6:00-9:00 A. M. Dr. Frederick Rice of New York in commenting on this says: "In regard to the causes of the high stillbirth rate during the afternoon, there are a large number of cases which are delivered after a long labor, as labor usually begins during the previous night or early morning. Also at this time of day the physicians are anxious to terminate the case, owing to the demands of other work." The last sentence is very significant, and how many can honestly plead "not guilty"? Many fetal deaths are admittedly due to causes beyond our control, but I believe a large number of babies could be saved if better judgment and less haste were used by the accoucheur. Take as an example, breech delivery and version with breech extraction wherein a higher incidence of fetal mortality is registered than in any other type of delivery. In this emergency it is so easy to become panicky and try to hurry the delivery with the result that the arms become extended above and back of the head, a very unfortunate condition. Then, to free the arms and shoulders, a violent twisting and angulation of the body, while the head is still fixed in the pelvis, will most certainly cause a serious injury to the vertebræ and spinal cord. In delivering the after-coming head, a too vigorous pressure on the fundus is the direct cause of many fatalities. A deep ether anesthesia and less haste will save the lives of many babies. Forceps extraction becomes necessary in from 3 to 5

per cent of all labors, and even under strict indications, and in the hands of skilled operators, there is definite risk to both mother and child. In too many cases forceps are applied because the doctor wants to get away and not on account of any obstetric necessity. I confess the temptation is great, but a little morphine or nembutal for the parturient, and a nap for the doctor, is often a safer procedure.

The great changes in our social and economic life in the last decade, no doubt, have had an indirect influence in keeping up the large stillbirth rate. We have read much of late about the abundant life, social security and curtailment of production, so why expect women to be willing to raise large families? Many years ago Dr. Condit at a Southern Minnesota meeting stated that abortions and miscarriages had increased 60 per cent since the advent of the automobile—and the speed of the automobile is increasing every year. The birth rate in the U. S. is steadily dropping, and in Minnesota alone there is a decline of approximately 25 per cent in the last fifteen years. If we are not to find ourselves in the same category with France, something must be done, and the first step would be a lessening of the number of stillbirths.

The practice of obstetrics brings less financial returns and requires more time and patience than any other field of medicine. Is it any wonder that very few young doctors want to give any special study to obstetrics when surgery will bring wealth and fame with much less loss of sleep? But if we are going to reduce this stillbirth rate, we must have better obstetrics. Dr. Clifford Lull of Philadelphia, in an analysis of 1,000 obstetrical cases, makes this statement: "May I say that I am irrevocably in favor of teaching undergraduate students the most conservative type of obstetrics, call it as you will, masterful inactivity, aseptic watchful waiting, or the Garden of Eden method?"

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RENAL AND URETERAL LITHIASIS*

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ALTHOUGH knowledge of the fundamental cause or causes of renal calculi remains almost as obscure today as it did twenty years ago, the diagnosis and treatment of stones in the kidney and ureter have reached a high plane of efficiency. The presence of calculi can be detected by a plain roentgenogram in 97 to 98 per cent of cases, and the accurate localization of stones can be accomplished frequently by intravenous urography alone, although in a certain number of cases cystoscopy is necessary. Stones may now be removed from the urinary tract with a very low mortality and a good end-result in almost all cases. The etiology, diagnosis, treatment, and factors of importance in the prevention of recurrence of renal calculi will be briefly considered.

Etiology

The basic etiologic factors responsible for the formation of renal calculi remain unknown although many theories regarding the development of stones have been advanced. It seems probable that there is no single causative agent active in all cases, as there is considerable variation in the abnormalities found in the study of individual patients. This does not mean that the actual chemical mechanism whereby stones are precipitated is not uniformly active in all cases. Theoretically, it seems possible that when the so-called protective urinary colloids are no longer able, for one reason or another, to maintain the urinary crystalloid material in solution, precipitation of certain urinary salts occurs and stones are formed. It may be that this explanation is entirely false, however, as the electrolytic imbalance which results in the precipitation of calculi might be entirely independent of any colloidal action. The various factors which seriously disturb the normal ionic balance are then responsible for the development of stone. This reduces the formation of urinary calculi to a physiochemical process which apparently may be initiated by a variety of abnormal conditions.

Clinically, obstruction and infection frequently are found associated with stones. In the past, infection was measured largely by the amount of pus in the urine without particular heed being given to the type of organism present. We now know that certain bacteria, such as *Proteus ammoniæ*, staphylococci, and certain streptococci which split urea into ammonia and carbon dioxide, thereby creating an alkaline urine, are the organisms most commonly associated with the presence of stones. It is also these bacteria, particularly *Proteus ammoniæ*, which are usually present in cases of recurrent calculi. This emphasizes the importance of the hydrogen ion concentration of the urine. In these cases it appears that the urinary colloids are less able to maintain the crystalloids in solution when the urine is decidedly alkaline. In support of this theory it is well known that many people for years have a chronic pyelonephritis of bacillary origin without the precipitation of calculi. In the treatment of patients with stones in the urinary tract associated with infection it is important to culture the urine in order to determine the exact nature of the bacteria present.

That infection does not account for all calculi is well shown by the fact that some stones develop in the presence of a sterile urine, and cultures of the stones themselves reveal no bacteria. Here, some other cause than infection must be responsible for the chemical disturbance in the urine which results in the precipitation of crystalline material. It has been demonstrated in recent years that endocrine and metabolic disorders may be related to the formation of calculi. Experimentally, renal calculi frequently develop in animals on a diet deficient in Vitamin C and Vitamin A. There is usually some associated infection in the urinary tract. Nephrolithiasis is not infrequently found in patients with hyperparathyroidism, presumably because of the disturbance of calcium metabolism which is known to occur in this disease, resulting in an excessive excretion of calcium in the urine. Possibly in this instance the urine becomes super-saturated with electrolytes. It has been fairly well demon-

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strated that cystine stones are formed as a result of a metabolic error in the catabolism of protein, whereby cystinuria develops and cystine crystals subsequently appear in the urine, are precipitated, and stone results. Knowledge of the etiology of stones is important in so far as it enables us to prevent the original formation or recurrence of calculi. Accordingly, an effort should be made to eliminate any of these factors which seems to be of significance in a given case.

Diagnosis

One of the most important single factors leading to a diagnosis of renal or ureteral calculus is an accurately taken history which creates suspicion of the urinary tract in the mind of the examining physician. Typical renal or ureteral colic at once suggests the presence of stone, and this diagnosis can then be readily verified or disproved by current methods of urologic investigation. Unfortunately, all stones do not give such typical symptoms, and the true diagnosis may then be confused with cholelithiasis, cholecystitis, appendicitis, colonic lesions, pelvic disorders, intercostal neuralgia, and other conditions. If one keeps the urinary tract in mind in the differential diagnosis, particularly in cases of right-sided abdominal pain, and has a plain roentgenogram made, most of these diagnostic errors would be avoided. Probably the most common erroneous diagnosis in a case of ureteral stone is appendicitis, and in a case of renal stone, cholecystitis. In an exceptional case a definitely diseased gallbladder or appendix may be present in association with stones in the urinary tract.

In the differential diagnosis of ureteral stone and appendicitis, the history, physical findings, and laboratory studies are of importance. In the former the pain is usually sudden in onset, severe, constant, and less colicky while it is present, though it may come in definite attacks, with periods of ease between bouts of pain. The pain may be located in the renal area, referred along the ureter to the bladder, or be localized in the right lower abdominal quadrant, especially when a marked ureteritis or periureteritis is present. Morphine is often necessary to relieve the pain. Nausea, vomiting, constipation, or diarrhea are uncommon. In appendicitis the generalized colicky abdominal pain, which localizes in the lower right quadrant and is associated usually with

nausea and vomiting, is well known. Although tenderness in the right lower abdominal quadrant may be present in both conditions, it is usually more marked in appendicitis. Rigidity is common in appendicitis but uncommon in ureteral stone. Urinalysis almost uniformly reveals erythrocytes and leukocytes if stone is present, whereas this is not true in cases of appendicitis. Acute appendicitis, when the appendix lies in contact with the ureter or causes periureteritis by extension of the inflammatory process, may occasionally cause a few erythrocytes to be present in the urine. This happens infrequently and hematuria associated with abdominal pain should always demand exclusion of the urinary tract. If from the history, physical findings, and laboratory data one feels that a ureteral stone might be present, a plain roentgenogram of the abdomen should be made, without preparation. Usually this will reveal a shadow if a calculus is present, and an intravenous urogram often localizes the shadow accurately and, in addition, supplies information regarding the relative and absolute functional capacity of each kidney and the amount of obstruction that is present. One should remember that an obstructing stone may cause complete failure of visualization of the kidney, although normal excretion of the opaque medium may occur following relief of the obstruction.

The differential diagnosis of nephrolithiasis and cholelithiasis is not usually difficult, although renal calculi occasionally cause predominately digestive symptoms and stones occasionally are present in both the gallbladder and kidney at the same time. Any patient who fails to obtain relief of pain following cholecystectomy should have the right kidney investigated.

Treatment

The surgical removal of stones from the kidney can be accomplished with satisfactory results in a very high percentage of cases if certain general principles are followed. Pelviolithotomy has entirely supplanted nephrolithotomy as the operation of choice except in cases of very large or branched calculi. The majority of stones can be readily removed through an incision in the pelvis, with no damage to the calices or renal parenchyma. If large, branched stones are present, it may be necessary to perform com-

bined pelvioneolithotomy in order to remove all the stony fragments without causing too great trauma to the kidney by forcibly extracting through the pelvis a large, irregular calculus

jury permanent nephrostomy may be employed.

If the kidney has been rendered practically functionless because of long-standing obstruction or excessive infection, and the opposite kidney is

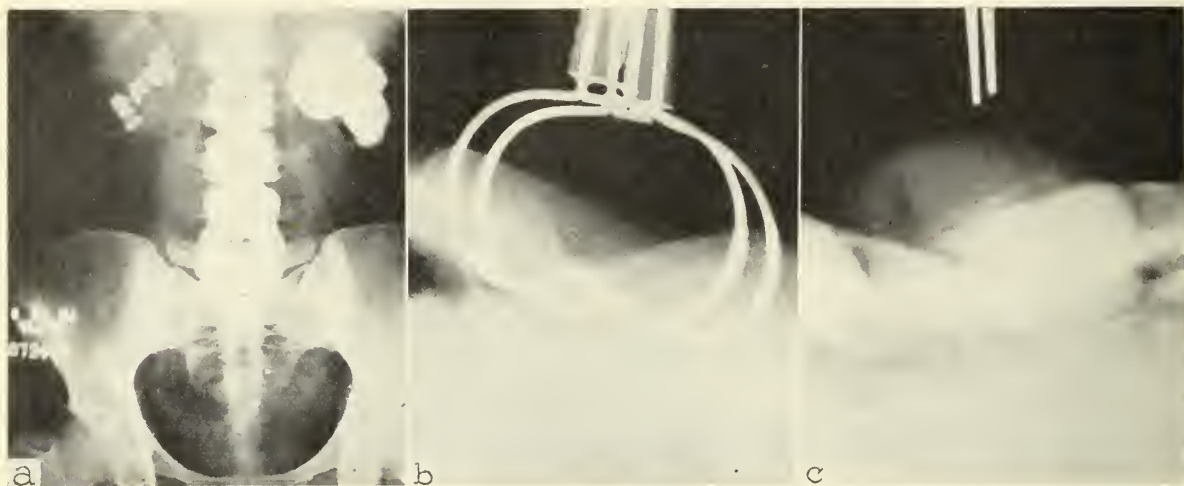


Fig. 1. The patient was a woman aged forty-two years who had bilateral nephrolithiasis. Pelviolithotomy, nephrostomy and a plastic operation on the left kidney, as well as right pelviolithotomy were performed. *a*, Preoperative roentgenogram showing bilateral renal calculi; *b*, roentgenogram of left kidney taken at time of operation and showing no further shadows; *c*, roentgenogram of right kidney taken at operation and showing no further shadows.

which extends into several or more calices. The use of fluoroscopy and roentgenography at the time of operation is of distinct help in making certain that all stones and fragments are completely removed.

For some years there has been a trend toward conservatism in renal surgery. As a result many kidneys are now saved which formerly were removed. I think that the use of nephrostomy, as advocated by Cabot and others, has been of considerable value in saving kidneys which previously would have been considered irreparably damaged. Although in some foreign clinics nephrostomy is performed each time a stone is removed from the kidney regardless of how much infection or renal damage exists, it has been our experience that the greatest field of usefulness of this operation is in cases in which there is marked infection and extensive renal damage. A number 16 to 22 F. soft rubber catheter inserted through the lower calix into the renal pelvis provides excellent drainage for the kidney and permits convenient pelvic lavage with various antiseptic solutions. The amount of restoration of renal function that follows elimination of infection and relief of obstruction is often remarkable. In certain cases of very serious renal in-

jury free of disease, nephrectomy is usually the operation of choice. Particularly is this true if the patient is middle-aged or older.

If a very small stone is present, which could obviously pass down the ureter spontaneously, operation is not indicated, but the patient should be kept under observation to determine if the stone passes or whether it remains and grows larger, in which event surgical removal would be indicated. There has been considerable discussion about the advisability of removing large, branched calculi, which for years are often almost symptomless until renal insufficiency supervenes. As a general rule it seems advisable to remove these stones unless other disease is present which definitely contraindicates operation (Figs. 1 and 2). If calculi of this type are not removed, renal injury is progressive.

Stones in the ureter, depending on their size, location, amount of infection associated, and condition of the ureter and kidney, may be: (1) allowed to pass into the bladder spontaneously, (2) removed by transurethral manipulation, or (3) removed by ureterolithotomy. Stones too large to pass spontaneously which are located above the brim of the bony pelvis and stones impacted in the lower portion of the ure-

ter should be removed by ureterolithotomy. Ureteral calculi located below the brim of the pelvis, if they are not too large, may usually be removed by transurethral manipulation. It is dif-

doctor, repeated manipulation with catheters and consequent dilatation of the ureterovesical orifice and lower part of the ureter will often be successful over a period of time in securing pas-

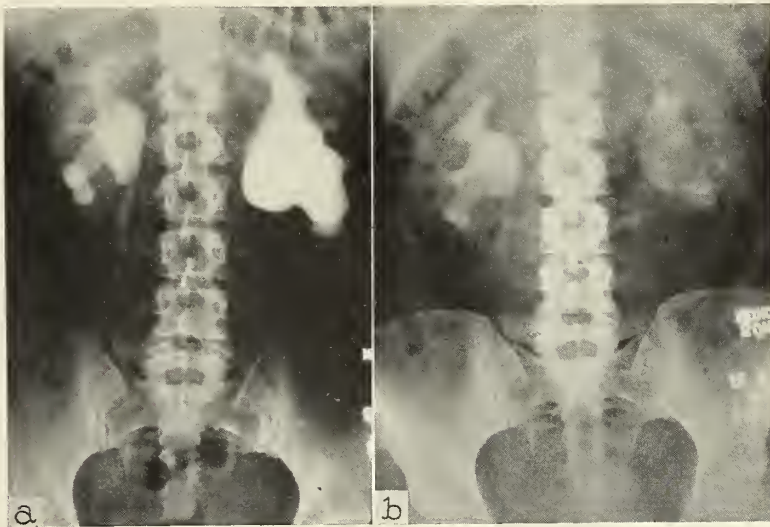


Fig. 2. Same patient as represented in Figure 1. *a*, Preoperative intravenous urogram showing bilateral hydronephrosis and caliectasis; *b*, postoperative intravenous urogram showing reduction in size of renal pelvis and calices.

ficult to set an exact limit on the size of a stone that can be removed transurethrally, as this will vary considerably depending on the size of the ureter, the position of the calculus, and on the amount of infection present. The manipulation of ureteral calculi is a highly technical procedure and in my opinion is usually far more difficult than ureterolithotomy. If successful and properly performed, however, this procedure saves the patient from undergoing a major operation.

There have been many instruments devised for the manipulation of ureteral stones. Aside from the use of multiple, twisted ureteral catheters, we have had most success with the Council stone-extractor. This is a spherical-shaped basket, formed by wires, which opens to engage the stone and then closes when the stone is extracted. There must be sufficient room in the ureter to pass the instrument alongside of the calculus. Occasionally this necessitates ureteral dilatation with multiple catheters for forty-eight hours prior to use of the Council extractor. All procedures of this type cause a certain amount of ureteritis, and one must exercise due care in order to avoid excessive trauma to the ureter. If the patient lives in the same community as the

sage of the calculus. It is always important not to permit an acute ureteral obstruction to occur, as renal function is then seriously jeopardized if prompt relief is not obtained.

Prevention of Recurrence

If the most satisfactory results are to be secured in the treatment of renal and ureteral calculi, attention should be given to certain factors that might be responsible for recurrence of stones. It is most important that all fragments be completely removed at the time of operation. Any condition causing obstruction to the kidney should be entirely eliminated. Postoperatively, the urinary tract should be rendered sterile if infection has existed. Depending on the type of organism present and associated conditions, this may be accomplished most efficiently by the oral administration of drugs, intravenous injection of neoarsphenamine, lavage of the renal pelvis, the ketogenic diet, or a combination of these various forms of treatment. Should any endocrine or metabolic disturbance be noted, it should be corrected prior to dismissal of the patient. Periodic examinations are desirable, especially in cases exhibiting a marked tendency toward recurrence.

TRENDS IN MEDICINE*

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Worthington, Minnesota

MY first duty is to thank you for the honor you conferred on me when you elected me President of the Southern Minnesota Medical Association. To be chosen to preside over this society which has among its members some of the most distinguished physicians in the world, naturally causes mingled feeling both of humility and pride. No one but an egotist could believe himself worthy and no one can fail to be proud of the honor. Little did I dream when I joined this Association fifteen years ago, when I first came to Minnesota, that it would ever be my good fortune to be its President.

It is a rather happy coincidence that this meeting comes on my birthday. I trust I am old enough not to accept every new theory advanced but still young enough to look with enthusiasm on the things which are helpful and beneficial to the wholesome progress of medicine. It is unfortunate when one is no longer interested in progress for then he is not an asset to his profession.

Medicine has made great forward strides in the last fifty years. It has advanced from a state of uncertainty to one of scientific accuracy. The specific organisms which cause many diseases have been discovered. With these discoveries a new field in medicine has been opened up—that of prevention.

Preventive medicine has advanced further and accomplished more in this country than any other. Unfortunately some members of our profession have not followed this trend in medicine and have entirely failed to grasp its importance to the extent that they confine their thinking and practice solely to one aspect of medicine, namely, to the treatment of disease. These physicians are as much out of place in the present day progress as an ox-cart would be on a congested highway. They should remember that the physician exists for the patient and not the patient for the physician. It is as much their duty to put forth their efforts in the prevention

of disease as it is to treat it after it has once developed. Surgery also has made wonderful strides so that today operations thought impossible a few years ago can be done with comparative ease and wonderful results.

Steps have been taken to improve the quality of physicians by bringing the medical schools of the country to a higher standard where the student would receive the proper training before being permitted to practice. This has brought about the elimination of the weaker medical schools so that today there are fewer than half as many medical schools in this country as there were at the beginning of the present century. The diploma mills have been eliminated and only schools exist which can give the proper training to fit one to administer to the medical needs of his fellow man. The medical graduate of today has many advantages over one who graduated twenty-five or more years ago. This is not to be construed that the older physician is not qualified to practice. He is, for with his practical experience and study, he has not only kept up but has advanced and it is he who saw the need and worked so diligently to bring about the educational progress that has been made. This advancement has been brought about almost entirely by the physician. Forgetting his personal interests he has striven continually to advance the scientific side of medicine and endeavored to give to the public the best medical service possible.

At the present time we are experiencing radical changes along many lines; some may be for the better, others, no doubt, for the worse. There seems to be a feeling on the part of some that everything is wrong and should be changed. Most of these enthusiasts are long on theory and short on experience and common sense. It seems to me there is nothing in the past to show that revolutionary changes have proven beneficial but on the contrary have caused much suffering and unhappiness and have been only temporary. Changes that have proven stable and lasting have come slowly and progressed gradually whether made in business, government or

*Presidential address before the Southern Minnesota Medical Association, Austin, Minnesota, August 26, 1935.

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medicine. They have come through the process of development in which the good has been sifted out and preserved rather than through the process of tearing down and building new. The medical profession made up of humans naturally is not perfect but it has done a most excellent job in the past and is constantly improving. Steady progress as has been made in recent years will bring better results than radical changes with the risk of destroying that which is good. Today the American citizen is receiving better medical care under the best trained physicians than has ever previously been the privilege of anyone in any country.

State Medicine

State medicine has been advocated by some, feeling that it would be an improvement over our present system. A careful study of the progress made in medicine and what has been accomplished shows the folly of thinking state medicine could have brought as good results. I wish to state that while I am a state physician I am opposed to the idea that state medicine should supplant our present system. It is doubtful if either the public or physician could benefit by it. It would destroy competition and individual effort—the very things that have made medicine what it is today. The physicians of southern Minnesota are what they are because they had real competition in the form of the greatest medical institution in the world right in their midst. It has been a great help to those practicing in southern Minnesota and has been the means of making them the most progressive as well as best trained practising physicians in any part of the world. It is doubtful if any such institution as this would be in existence if it had to depend on the state or federal government to make it such. It was founded and developed largely through individual effort by men with vision, training, determination, foresight and willingness to work.

Let us look at the medical schools of the country. What made the greatest of them the schools they are? It was largely the effort of outstanding men, leaders in their profession. If five or six of the best medical schools of our country were to be selected today it is doubtful if a single one of the State Medical schools would fall in this group. This does not mean

there are not excellent medical schools in some of our state universities; they are all better than the best medical schools were a few years ago. It is well that we have had the independent medical school for it has been a great factor in making the state schools what they are at present.

There is nothing to show that state medicine would serve the public better, but much to the contrary. This does not mean that the state should not concern itself with medical matters or enter into certain phases of it. There are fields in which the state can enter with benefit to all concerned. The State Board of Health (state medicine, if you wish to label it such) has done much and is necessary in the control of preventable diseases. It should have the united support of the medical profession. The state in taking care of the mentally unfit is rendering a service that could not be otherwise obtained. The same is true of tuberculosis. There are very few patients who could provide their own treatment without state aid. To permit them to go uncared for would not only deny them the chance to recover but would also submit those with whom they associate to the danger of the disease. Although the state is taking care of many patients afflicted with tuberculosis, and the annual death rate from tuberculosis is one-third of what it was in 1910, the average physician is doing more tuberculosis work today than ever before. It may be true that it is largely preventive but this is when it brings the best results. The proper coöperation between the physician and the state in those fields where it is necessary for the state to enter will do much to prevent state medicine. An understanding public does not care for state medicine for it is contrary to the ideals of the average American citizen. It would seem, therefore that with the proper coöperation of the practicing physician in the control of preventable diseases it will never be a reality. This is not an inference that the private physician should leave the state to take care of the preventable diseases but he should give the state the proper assistance in their control. This will bring the desired results and the physician will retain his patient. He can help the state do what it can not do alone and the state can aid him in doing what is best for the patient and the public.

State Public Health Association

We are fortunate in having in this state a Public Health Association directed by physicians and allied closely with the State Medical Association, a relationship proving helpful to both organizations. It has been doing a wonderful piece of work especially in the fight against tuberculosis. The results obtained have been brought about largely through the interest and support of the medical profession. Its work is statewide, and in order to get the best results it is necessary to have the backing of every physician as well as the united support of all the counties. Unfortunately two or three counties under the direction of some well meaning but poorly advised people felt they could accomplish more and do better work if they pulled away from the state organization and directed their own destinies. Naturally the expected results did not materialize for statewide organization in a program of this character is essential. None of these counties show as low a death rate from tuberculosis as those immediately surrounding them. It must be somewhat embarrassing to the physicians practising in these counties to have such a condition exist knowing that it is to a certain extent a reflection on them even though they were in no way responsible for it. The physicians of these counties could do a worthwhile piece of public health work if they would take a greater interest in their county organization, encouraging it to unite with the state organization, for with an united front only can the best results be obtained. Every effort possible should be made to bring these counties into the State organization so that greater good can be accomplished. There is no state in the union having a better Public Health Association than the State of Minnesota. It is largely because it is so closely related to the State Medical Association that it has been able to accomplish what it has. To continue the pleasant relationship of the past will help the medical profession and the association to render a greater service to the public and also serve to prevent state medicine. Such organizations need medical direction so that wasted effort may be avoided. The Public Health Association should not only have the endorsement of every practising physician but also his wholehearted support.

The Public Health Nurse

The Public Health Nurse has come with changing conditions and progress. Maybe every nurse is not an ideal one; neither is every physician. There are some physicians who condemn, without reason, the public health nurse as being an unnecessary evil. They seem to forget that she may be the daughter or sister of a physician. Hers is a profession that is honorable and necessary and can be a great help to the physician. His coöperation and interest should be mutually helpful in rendering a greater service to humanity.

Tuberculosis

It would hardly be fitting for me to close this paper without touching on tuberculosis, since the greater part of my professional life has been spent in this work.

The state of Minnesota holds an enviable position in the campaign against tuberculosis. It is well provided with institutions for the care of those suffering from this disease. The physicians of the state for the most part have co-operated in its prevention and treatment. The result is that the death rate has fallen from 110 per hundred thousand in 1910 to thirty-five per hundred thousand in 1934. This wonderful result could not have been accomplished had it not been that the physicians and state had co-operated in the fight. I am sure the average physician is doing more real tuberculosis work at the present time than he was doing in 1910 before any institutions for the care of the disease were built, and it is of a nature that brings better results.

As an example of the coöperation on the part of the physicians I would like to mention a piece of work done in one of the counties of the Southwestern Minnesota Sanatorium district. The physicians in Lincoln County decided they wanted the pupils of the schools of that county tested for tuberculosis and made application to the sanatorium for same. It looked like a big undertaking, especially to attempt to test the pupils from the rural schools. They felt that this could be satisfactorily accomplished by having the pupils from the rural schools come into the towns at the same time the tests were being given there. Through their wholehearted co-

operation, 85 per cent of the pupils of the rural schools and 95 per cent of those in town schools received the test. I believe this is one of the most completely tested counties in the country, and at the same time it had one of the lowest percentages of reactors of any on record, 3.2 per cent of the children of the largest town and only 2.8 per cent of the children in the county seat, the average for the county being only 4.3 per cent. This low percentage of reactors was due largely to the work that had been done by the physicians of that county in finding cases early and having them enter the sanatorium or be properly cared for before they had become a danger to their associates. Every child who reacted was x-rayed. These physicians are rendering a real service to humanity. It is a service of prevention rather than one of unsatisfactorily treating a disease when it had become clinically active. As long as they render a service like

this to their community there is a very little danger of state medicine becoming a reality. It is the physician who fights every movement as state medicine, regardless of its merit, and allows his patient to die and others to become infected with preventable disease who will bring state medicine. The public wants and will demand protection, and if the private physician cannot give it, the public will seek something different. There is no reason why the state cannot help the physician take care of a patient who cannot get the proper care otherwise. The proper co-operation between the state and physician will give better results than can otherwise be obtained and the best should be the goal desired by all. Every effort possible should be made to give the people the best medical service both in prevention and treatment, for by so doing the public and the physician will both be benefited.

THE SYMPTOMATOLOGY OF EPIGASTRIC HERNIA

Analysis of 296 Cases

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and

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THE presence of an epigastric hernia in a case in which the patient complains of epigastric pain and indigestion leads the physician, in the absence of obvious pathologic change within the abdomen, to speculate as to the possible relationship of the lesion of the abdominal wall to the symptoms. The symptoms attributed to epigastric hernia have been said by Moschowitz to be so constant as to be practically diagnostic,^{6,7} and "to consist of eructations, nausea, and periodic attacks of pain localized into the entire epigastrium." Other observers find that the symptoms may resemble those of peptic ulcer, cholelithiasis, gastritis, cancer, and pyloric obstruction,^{3,9} and the frequent coexistence of such

symptoms and visceral disease has often been observed.^{4,5,8,10}

In the absence of demonstrable visceral disease, symptoms usually regarded as visceral in origin have been explained as due to inclusion of a part of the hepatic ligament in the preperitoneal fat comprising the hernia, with irritation of the parasympathetic nerve fibers and reflex stimulation of the solar plexus.^{2,8} If, as infrequently occurs, the fascial defect becomes so enlarged that a peritoneal sac develops, the lesion is subject to the same symptoms and complications as hernias elsewhere.¹

In order to determine the relationship of epigastric hernias to visceral symptoms, an analysis was made of all cases of epigastric hernia repaired at The Mayo Clinic from 1910 to 1933, inclusive, with correlation of the preoperative

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symptoms, the surgical findings, and the late postoperative results.

The cases divided themselves into two major groups, 138 patients being hospitalized for the surgical treatment of some associated condition, with secondary repair of the epigastric hernia, and 158 being hospitalized for symptoms which it was hoped that repair of the epigastric hernia would alleviate.

In the first group of 138 patients with known associated visceral diseases, the symptoms were primarily those of the visceral lesion, and the results in the 131 cases in which the further course was known are given in Table 1.

TABLE 1. RESULTS IN 138 CASES IN WHICH EPIGASTRIC HERNIAS WERE REPAIRED IN THE COURSE OF OPERATIONS PERFORMED PRIMARILY FOR OTHER CONDITIONS

Operations	Patients	Per cent relieved by combined procedures
Appendix	29	52
Gallbladder:	32	
Stones present		80
Stones absent		58
Stomach, duodenum, and small intestine:	56	
Benign lesion		88
Gastric carcinoma	13*	15†
Miscellaneous‡	14	100
Total	131§	

*Eight of these patients had inoperable carcinomas.

†Of the five patients operated on, three are dead and two are living, one sixteen years and the other eight years after operation.

‡The epigastric lesions associated with the conditions for which these miscellaneous operations were performed were asymptomatic.

§The further course in seven cases was not known.

The 158 patients in the second group who were hospitalized for repair of epigastric hernia were divided into three sub-groups, twenty-six undergoing abdominal exploration at the time the epigastric hernia was repaired, thirty-seven having the epigastric hernia repaired at the same time a coëxisting inguinal, femoral, or umbilical hernia was repaired, and ninety-five having the epigastric hernia alone repaired, without abdominal exploration.

Of the twenty-six cases in which abdominal exploration was associated with repair of the epigastric hernia, the abdominal exploration was

negative in eleven cases; in fifteen cases an associated visceral disease was treated surgically at the same time the hernia was repaired. Of the eleven cases in which abdominal exploration was negative, the symptoms in seven cases were only of local pain on exertion; in the remaining four cases visceral symptoms were present. These visceral symptoms varied from hunger pains, which were localized in the epigastrium and were relieved by food and alkali in one case, to diffuse abdominal cramps, bearing no relation to meals or exertion, in another. In no two cases, however, was there a common visceral symptom. Two of these patients were subsequently relieved of symptoms following repair of the hernia and additional instruction in dietary precautions and elimination; two have not subsequently been heard from. Of the seven who complained only of local pain on exertion, three were relieved by repair of the hernia, one had recurrence of distress associated with recurrence of the hernia, and three have not subsequently reported.

Visceral symptoms were present in all of the fifteen cases in which abdominal exploration was performed at the time the hernia was repaired and in which the visceral disease was treated surgically at the same time. The visceral symptoms varied widely and conformed, in general, to the usual symptoms associated with the coëxisting visceral lesion, such as upper abdominal colics in those cases in which there was associated cholelithiasis, hunger pains with relief on taking food in cases of associated duodenal ulcer, and soreness and tenderness in the epigastrium with vomiting in two cases in which there was subacute purulent appendicitis. There was, however, no common or typical set of visceral symptoms in all cases, which should have occurred had the visceral symptoms resulted from the epigastric hernia common to all. The late results in this group of fifteen cases were as follows: One patient with obstruction of the small bowel was well after relief of the obstruction; one patient with duodenal ulcer was well after gastroenterostomy; of five patients with cholecystitis, three were well, one had further trouble, and one was not heard from, after cholecystectomy; one patient with duodenal ulcer was not heard from after his return home following gastro-enterostomy, and of seven patients with appendicitis, one was well, three had further in-

digestion, and three did not report, after appendectomy.

Of the thirty-seven cases in which the epigastric hernia was repaired at the same time an inguinal, femoral, or umbilical hernia was repaired, the further course is known in thirty cases. Before operation, twenty-one of these patients had no visceral symptoms but complained simply of local distress at the site of the epigastric hernia on straining; of these twenty-one, seventeen had no further trouble after repair of the epigastric hernia, four continued to have local distress at the operative site on lifting or straining, one of the four having an associated recurrence of the hernia. Nine of the thirty patients who underwent operations for multiple hernias had visceral symptoms. There was no characteristic visceral symptom common to all nine patients. Three had hunger pains when the stomach was empty, two being relieved postoperatively after the diet had been changed; one continued to have distress. One patient had eructations and mild upper abdominal colics after meals, which continued after the hernias were repaired. Five patients had generalized abdominal pains associated with constipation and flatulence; two were relieved postoperatively on institution of an anticonstipation diet, and three continued to have the same distress.

Of the ninety-five cases in which the epigastric hernia was repaired at the primary operation, abdominal exploration not being performed, the late results are known in seventy-five cases. Visceral symptoms were not present in thirty-three of these seventy-five cases, the patients complaining only of the presence of deformity, which was usually associated with local pain on exertion. Of these thirty-three patients, twenty-six were relieved of all symptoms by repair of the hernia, whereas seven continued to have local pain at the operative site on straining. Three of the seven who continued to have local pain had associated recurrence of the hernia.

Forty-two of these seventy-five patients who underwent repair of the epigastric hernia only had associated visceral symptoms. No group of visceral symptoms was common to all patients in this group. Only eight of these forty-two patients were relieved of the visceral symptoms postoperatively, and of these eight, four had hunger pains relieved by food or alkali, and re-

ceived instructions similar to those for patients treated medically for ulcer, whereas the other four had gas pains associated with constipation and received instruction in an elimination diet, after the operation for epigastric hernia.

Thirty-four of the forty-two patients with visceral symptoms who at the primary operation underwent repair of the epigastric hernia continued to have the same visceral symptoms after operation. Seventeen of these thirty-four patients have had no further surgical procedure, and the nature of their preoperative and postoperative visceral symptoms was as follows: Eight had periodic episodes of gnawing epigastric pain when the stomach was empty, relieved by the ingestion of food or alkali, six had upper abdominal distention and eructations of gas after heavy meals, associated with mild epigastric colics, and three had diffuse gas pains associated with constipation and flatulence.

Seventeen of the thirty-four patients whose visceral symptoms were not relieved by repair of the epigastric hernia required secondary surgical procedures. Ten had fullness in the upper part of the abdomen associated with eructations and upper abdominal colics of varying severity, and were found at the secondary operation to have cholecystitis, in nine cases with stones. Following cholecystectomy, six patients were relieved, three had further indigestion, and one did not report. Two had had epigastric pains when the stomach was empty, but these pains were relieved by ingestion of food or alkali; at the secondary operation both patients were found to have duodenal ulcer. Following gastro-enterostomy, one was relieved and one failed to report. One patient had nausea, epigastric pain and regurgitation which were not relieved by repairing the epigastric hernia; at the secondary operation a palliative gastro-enterostomy was done for inoperable carcinoma of the stomach, the patient living four months after the operation. One patient had had pains in the right loin which were projected to the epigastrium and were accompanied by vomiting; they persisted after repair of the epigastric hernia until they were relieved by a right nephrectomy for pyelonephritis. One patient had nausea, vomiting, and epigastric soreness, which grew progressively worse after the epigastric lesion was repaired until seventeen

months later when localizing signs of cerebellar tumor appeared. On exploration, an inoperable cerebellar tumor was found and the patient died four days later. One patient had epigastric pain with vomiting immediately after meals, which persisted after the epigastric hernia was repaired. Three months later a carcinoma of the pancreas, with metastasis, was found. One patient had recurring pain in the right lower abdominal quadrant with soreness in the epigastrium; this persisted following repair of the epigastric hernia. Following secondary appendectomy, the patient was relieved except for some pulling sensations in the region of the scar.

Summary

In regard to the symptoms, the patients with epigastric hernia who did not have obvious visceral disease divided themselves into three groups: One group had no subjective symptoms, desired surgical interference purely for cosmetic reasons and to confirm the diagnosis, and obtained uniformly good results from repair of the hernia. The second group complained simply of local pain in the abdominal wall at the site of the hernia, on straining. The majority of these patients obtained relief from repair of the defect in the abdominal wall. A few continued to have pain at the operative site on exertion, even though the defect in the abdominal wall remained closed, and a few had recurrence of symptoms associated with recurrence of the hernia.

In the third group, consisting of patients who complained primarily of visceral symptoms, no single symptom was found to be characteristic, either for those who were subsequently relieved of their distress or for those who continued to have further trouble. A number of those who were subsequently relieved of indigestion had complained of periodic episodes of burning epigastric pain, coming on several hours after meals and relieved by ingestion of food or alkali. In all cases roentgenograms of the stomach were negative, and in only one case were the values for free hydrochloric acid in the stomach increased above normal. The remainder of those who had had visceral symptoms before the epigastric hernia was repaired and who were subsequently relieved of these symptoms, had had

diffuse abdominal cramps, associated with constipation, relieved by the passage of a stool or flatus. In both these sub-groups, the patients received appropriate advice concerning the diet and regimen to be followed postoperatively, and it seems quite probable that this was a more important factor in the relief of the visceral symptoms than repair of the epigastric hernia.

The total number of patients relieved of visceral symptoms following repair of epigastric hernia alone, 22 per cent, does not compare favorably with the group in which the patients were relieved when the symptoms consisted simply of local pain on exertion, 72 per cent, or the group in which repair of the epigastric hernia was associated with operation for a coëxisting visceral lesion.

Conclusions

In this group of 296 cases, no group of visceral symptoms was found which could be said to be typical of epigastric hernia which was amenable to surgical repair. The frequent co-existence of organic visceral disease recognized at the time the hernia was repaired, or subsequently, emphasizes the importance of opening the abdominal cavity and exploring its visceral contents at the time the hernia is repaired, whether or not preoperative diagnostic procedures have been able to localize organic visceral disease.

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Gallbladder Surgery and Dr. Ohage

THE name of Dr. Justus Ohage will ever be associated with the development of gallbladder surgery. The sketch of his life which appears in this issue indicates the bold pioneer spirit which led him to come to this country at the age of fifteen. After receiving his medical degree from the University of Missouri in 1880, he was ambitious for further surgical knowledge and it was his postgraduate work immediately pursued in Germany and England that led to his pioneer gallbladder work soon after locating in Saint Paul in 1881.

In the *Northwestern Lancet* of November 1, 1886, under the report of the Ramsey County Medical Society meeting of September 27, 1886, appears the following:

"Dr. Ohage then showed a very interesting specimen of a gallbladder which he had extirpated four days before. The case was that of a lady diagnosed

empyema of the gallbladder. Only one large vertical incision was made instead of the usual T; about half a pint of watery liquid was found and a large stone impacted in the cystic duct; the stone was worked back into the bladder before it was removed.

"The greatest difficulty was found in separating the natural adhesions to the liver; the bladder was removed without aspiration and the abdominal wound was closed completely. This is the fifth day after operation, the temperature is normal and the patient is doing well. This is the sixth operation performed, five of which recovered."

Our attention was also called to an article by Dr. Ohage entitled, "The Surgical Treatment of Diseases of the Gallbladder," in *The Medical News* for February 19 and 26, 1887. In this article he discusses cholecystotomy and cholecystectomy and reports the number of operations to that date.

To Marion Sims he gives the credit for the first cholecystotomy, in April, 1878, but the patient died from hemorrhage. Kocher, in June, 1878, first performed this operation successfully, the patient recovering in five weeks. To date, Dr. Ohage had found fifty reported cases of cholecystotomy with thirty-nine recoveries.

Cholecystectomy, on the other hand, was first proposed by Langenbuch of Berlin. By 1887, Dr. Ohage found it had been performed nine times. Langenbuch had performed it five times with one death; Theriar twice successfully; Courvoisier once successfully, and Dr. Ohage once successfully, his case being the first reported in the United States. He reports the case in detail and it is interesting to note that no drainage was used.

Dr. Ohage then was the first surgeon to perform a cholecystectomy in the United States. This was carried out September 24, 1886, at St. Joseph's Hospital, Saint Paul, and it is interesting to note that the patient lived forty-three years following operation. This was in the transition stage between antiseptic and aseptic surgery and the statement by Dr. Ohage that "cleanliness is the cardinal rule of antiseptic surgery" is significant. The pioneer gallbladder surgery of this eminent member of our profession is well worth recalling.

Biopsy Condemned

BIOPSY undoubtedly lends itself to more accurate diagnosis although it must be admitted that it is by no means 100 per cent accurate. Does not this attempt at accurate scientific diagnosis often work to the disadvantage of the patient?

The author of an article entitled "Penalties of the Biopsy"* calls attention to the inconsistency of recognizing the danger of metastases from injury to a cancer and then deliberately cutting into a cancer to obtain a biopsy.

A metastasis results from dissemination of cancer cells through blood or lymph circulation and is a matter of seconds rather than hours or days. Cutting into a cancer, be it of the cervix or fundus of the uterus or of the skin or breast, carries with it the possibility of prompt metastasis even though operation follows in a few hours or days.

In the case of a suspicious appearing cervix, the author of the article mentioned admits a feeling of guilt after taking a biopsy even though he immediately cauterizes the site and promptly operates.

The diagnostic curettage is a common procedure and should be heartily condemned. When the clinical history and examination point to a carcinoma of the fundus, a diagnostic curettage only increases the danger of metastasis and the examination of curettings is notoriously unreliable. A curetting never includes the entire uterine cavity and the cancerous tissue may be missed. The histological examination may also miss the cancer in the curettings. Often, too, there is an unnecessary delay between the curetting and the operation which further diminishes the likelihood of cure of cancer, the location of which makes it particularly amenable to complete operative removal.

The reasoning of the author of the article mentioned is perfectly logical and is confirmed by clinical experience. His condemnation of the practice of biopsy examination by cutting into the cancerous growth deserves emphasis.

*Kennedy, J. W.: Penalties of the biopsy. *Med. Record*, 142:560, (Dec. 15) 1935.

Protamine Insulate

NOT infrequently one encounters a diabetic patient in whom the control of glycosuria is impossible even by the administration of four or five injections of insulin in twenty-four hour periods. The blood sugar level regulatory apparatus seems so sensitive that in spite of the several injections the blood sugar at times in the twenty-four hours is abnormally high, resulting in glycosuria, and at other times abnormally low, producing symptoms of hypoglycemic shock.

Repeated attempts have been made to delay the absorption of injected insulin without success. Now comes the announcement that certain Danish investigators* have been able to produce this slower absorption of insulin by the addition of a monoprotonamine derived from the sperm of a salmon. When it was found that the injection of this protamine into a normal human being was harmless, its use in combination with insulin was begun clinically. Its use on eighty-five diabetic patients during the past two years has apparently proved its value. While not replacing insulin in acidosis, where quick action is needed, nor in mild cases easily controlled by small doses once a day, this new mixture is indicated in the more severe cases, sometimes alone but more often in conjunction with insulin. Careful clinical investigation reported by the authors shows a leveling off of blood sugar levels due to the more prolonged effect of this mixture.

The product is not yet commercially available but doubtless will be so before long. The discovery promises to be of great value in the treatment of certain diabetic patients requiring insulin.

Cyanide Antidotes and Medical Progress

Recent successes with methylene blue and sodium nitrite in the treatment of cyanide poisoning are striking. As a result, the treatment of poisoning in general is receiving more attention and undergoing creditable revision. Methylene blue and sodium nitrite are far apart chemically, physically and pharmacologically, so that a common factor in their antagonism of cyanide poisoning would hardly be suspected. Yet that is exactly what has been discovered, and the discovery testifies to the value of the experimental method in medical science. This common denominator is specific and definite. Its utilization should remove all guesswork from the treatment of cases of cyanide poisoning. (*J. A. M. A.*, November 2, 1935, p. 1433).

*Hagedorn, H. C., Jensen, B. Norman, Krarup, N. B., and Wodstrup, I.: Protamine insulate. *Jour. Am. Med. Assn.*, 106:176, (Jan. 8) 1936.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

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What Can I Do For My County And State Medical Society?

Suggestion Number Five

1. Do not be guilty of advocating or encouraging health insurance or socialized medicine by such careless remarks as these:

"Socialism is bound to come"

"We should be prepared for socialized medicine"

"A large portion of the population has inadequate medical care"

"European countries have found out that state medicine works"

Statements of this kind are sometimes made, even by physicians. These physicians have not investigated the facts.

2. If, by any chance, it is your conviction that any of the above statements are correct, thoroughly investigate the data that are available at American Medical Association headquarters.

Discuss the subject thoroughly with well informed officers of the association. You will then understand why organized medicine is doing everything in its power to insure the continuance of the American system of medical practice; why organized medicine fears and rejects all visionary theories for government control.

fluenced to believe that the present methods of caring for the sick are inadequate and that the establishment of a system of health control under federal and state supervision would offer the best solution.

Unfortunately, there are members of our own profession who have expressed themselves as favorable to health insurance and state medicine.

Difficult to Repair

Most of these colleagues, strange as it may seem, have received their information from every source except that great storehouse of accurate information which has been accumulated in the headquarters of the American Medical Association. They have made little or no effort to get in touch with these sources of information or with the officers of the association who are familiar with them. In the quest for knowledge, various lay societies have appealed to some of these iconoclasts for guidance. The unfortunate impression left by our representatives who criticize the present system of practice and advocate governmental control is difficult to repair.

Selling Their Heritage

To the shame of our profession a group of physicians in the east have organized a society to further socialism of medicine. They have done so without seeking information or counsel from organized medicine. In their ranks are many who, under the urge of economic distress, are willing to sell the heritage of the ages for immediate gain. There is nothing more injurious to American medicine than to have its own members snipe at policies which are supported by an overwhelming majority of the medical profession. While the present system of medicine is not perfect, it is so far superior to any other which has yet been advanced that it would be

Concerning Some "Medical Opinion"

Stimulated by efforts on the part of the federal government to readjust various phases of social inequality, the desirability of state control of all matters pertaining to health is being widely publicized. It has become a favorite subject for debate in colleges and high schools; it is heard over the radio, and is often discussed in gatherings of various kinds. As a result, the public is being in-

folly to adopt any of the proposed methods of reform.

More Fancy than Fact

Many of our colleagues who advocate state medicine have made statements which are based more on fancy than fact. Among these is a widely quoted statement to the effect that a large percentage of the population receives inadequate medical care. In proof of this, reference is made to surveys made by the Committee on the Cost of Medical Care, the United States Public Health Service, and by the Medical Societies of Michigan and of California. It has been repeatedly shown from information held in the files of the American Medical Association that these investigations are most inadequate and that they have reached many conclusions which are erroneous. A statement widely publicized to the effect that 40 per cent of the public do not receive adequate medical care was made recently by one of our colleagues before a public gathering, and is an example of the cloudy and inaccurate statements which are so often bandied about in the course of so-called authoritative talks on this subject. This assertion is a direct reflection upon the members of the medical profession and insinuates that they would deliberately permit anyone who sought medical advice to suffer for want of it.

They do Not Know

Statements also have been made by physicians that the personal relation existing between the patient and the physician and the method of selecting physicians are of minor importance. Such statements usually are made by men who have not engaged in the general practice of medicine and who do not appreciate the full value of the personal relationship which is essential to the best medical care. Unfortunately, their remarks are accepted as indicative of the opinion of a considerable proportion of our profession.

Members of our profession have cited the experience of European countries with state medicine as examples of the benefits of such reforms. They do this in spite of the fact that it has been shown repeatedly that governmental control and compulsory health insurance are accompanied by continually increasing costs and by complications which are uncontrollable and which are injurious to the care of the sick.

Leading to Commercialism

There are advocates among physicians for medical care on a voluntary prepayment basis. This is done in spite of the fact that experience has shown that sooner or later such schemes lead to commercialism and to competitive bidding. This reduces the fees to a level which makes it impossible to supply adequate medical care. If you doubt this, write to Dr. Leland of the Bureau of Medical Economics and let him supply you voluminous evidence to prove it.

Far from True

Casual remarks such as "State control of medicine is bound to come," may give the impression that such convictions are commonly held by physicians. Such evidence of defeatism does no one any good and, judging from recent developments, it is far from true. The majority of the medical profession firmly believe that the common sense of the American public is too great to allow tinkering and experimentation with their health such as is advanced by these socialistic theorists. There is every indication today that the American people are waking up to the dangers of the socialistic experimentation. A decided reaction has set in against many of the proposed innovations. It would be a sad day for American medicine and for the state of the general health if public opinion could be led astray by socialistic propaganda.

Ready to Debate

The regional high school debates will soon be under way in all parts of Minnesota.

Subject: Resolved that the several states should enact legislation providing for a system of complete medical service available to all citizens at public expense.

Presumably, physicians have been in touch with debate coaches and teams in every community where high schools have entered teams.

They have made occasions to meet and talk things over with the debaters.

They have made a point of seeing that the debaters and their coaches were supplied with all the material that is available at state headquarters, 11 West Summit Avenue, Saint Paul.

They have made arrangements to be present at any of the debates held in their own commu-

nities and, if possible, have asked for a little time to sum the question up at the time of the debates.

One Member Did It

One member from a Northwest town did that and more. Then he sat down and wrote an outline of his work for the information of and assistance of others who might wish to do likewise.

Against the possibility that, here and there, busy medical men have neglected this extremely important obligation, his interesting résumé is printed herewith. There is still time for physicians in other localities to see that debaters are properly supplied with material on the negative side of these debates.

Says this member:

"I first contacted the coach of the debaters, giving him all the materials which I had, medical magazines, American Medical Association Material and various articles from our own MINNESOTA MEDICINE and write-ups which I had taken from other articles in other magazines relative to the question. I also had a good talk for about an hour and a half with the coach in my office one evening when both of us had plenty of time to talk the matter over. A book containing some reports of the Committee on Costs of Medical Care was loaned to him for his use.

"I then contacted the coach of the extemporaneous speakers in our high school and also the teacher who has charge of the business course in our school.

Talked to Students, Teachers

"I gave the talk as outlined in the speech sent by you, before the members of the debating team and the extemporaneous speakers and also to the girls in the stenographers' class, together with the three teachers. I elaborated here and there with some of my own experiences and various statistics and figures which I had obtained elsewhere. With the aid of the stenographers we then placed copies of the talk in the hands of all the speakers. Following that I put the bulletin from the American Medical Association in which appeared the radio debate which presented both sides of the question into their hands to be copied and distributed to the debating teams.†

To Answer Last Minute Questions

"I have arranged it so that, at the time when the speakers are about ready to appear in the debates, I, and perhaps one or two other doctors here in the city, can hear them and comment on the points made as the talks are given. This will be a sort of dress rehearsal and it will give us a chance to answer any question which may have arisen in the minds of either affirmative or negative debaters.

†Reprints of this debate by Dr. Morris Fishbein, Dr. R. G. Leland for the negative and William Trufont Foster and Bower Aly for the affirmative are now available at the State Office.

"I believe it has thus been possible for me to impress upon the students of our high school that there is really only one side to this question: that we are not, however, fanatics on the subject but willing to learn anything which may be of use to us from the affirmative arguments.

"I have the coaches on our side and know that no impression will be made in this community that is detrimental to the medical profession."

Two to Six!

Final returns showed *two victories* for the negative and *six victories* for the affirmative in the Western Conference of College Debating Teams.

Inter-collegiate debates were completed in December. High School debaters heeded them well and will model their strategy on both sides upon collegiate models.

They need and will welcome authoritative assistance in preparations for the defense of the negative side.

Members of the Minnesota State Medical Association have a special responsibility and obligation to help them.

"Their Own Worst Enemies!"

—Dr. Holmes

EDITOR'S NOTE: This is the second of a series of communications by Dr. B. J. Branton of Willmar, chairman of the Medical Legal Advisory Committee, on problems associated with malpractice litigation.

Dr. Oliver Wendell Holmes was not only a pleasing poet, a learned physician, but a scholar of unusual perception. In his valedictory address to the graduating class of the Bellevue Hospital College over a half century ago he said, among other things:

"Your relations to your professional brethren may be a source of life-long happiness and growth in knowledge and character, or they may make you wretched and end by leaving you isolated from those who should be your friends and counsellors. The life of a physician becomes ignoble when he suffers himself to feed on petty jealousies and sours his temper in perpetual quarrels. You will be liable to meet an uncomfortable man here and there in the profession,—one who is so fond of being in hot water that it is a wonder all the albumen in his body is not coagulated. There are common bar-rators among doctors as there are among lawyers,—stirrers up of strife under one pretext or

another, but in reality because they like it. They are their own worst enemies and do themselves a mischief each time they assail their neighbors. The great majority of the profession are peacefully inclined. Their pursuits are eminently humanizing, and they look with disgust on the personalities which intrude themselves into the placid domain of an art whose province is to heal and not to wound."

Your Medico-legal advisory committee brings this quotation to you with the hopes that after reading it, you will make a resolution towards your fellow members of the association in accord with the beautiful thought it contains. *Remember that ill conceived criticism of the former physicians on the case, accounts for the fact that 51 per cent of the cases in Minnesota are started within the walls of a doctor's office.*

B. J. BRANTON, M.D.

Medical Care For Pensioners

Minnesota recipients of old age pensions under the Social Security Act and the new Minnesota law, will be allowed medical, dental, surgical or hospital assistance, or nursing care in addition to their pensions.

This provision was introduced into the bill through the interest and assistance of State Senators Dr. J. L. McLeold of Grand Rapids, Dr. C. I. Oliver of Graceville and Representative Carl J. Eastvold of Ortonville after consultation with the Committee on Public Policy and Legislation of the State Association, of which Dr. L. L. Sogge of Windom is chairman.

The provision reads (c, under Section 5):

"While a recipient is receiving old age assistance, he shall not receive any other relief from the state or from any political subdivision thereof, except for medical, dental, surgical or hospital assistance or nursing care."

The final bill was in the hands of conferees from the Senate and the House at the time this issue went to press and was certain of passage pending the adjustment of certain differences. The matter of medical care for recipients was not in dispute.

Local Units Responsible

Legislators readily appreciated the impossibility of paying medical and hospital fees on a pension of thirty dollars a month, the maximum limit set in the bill.

The understanding of the Legislative Committee is that the payment for these specified services for recipients of pensions would become the responsibility of the county commissioners in counties that are on the "county plan" of care for the poor and upon the town board in localities that are on the "township plan."

Here again is a job for the Contact Committees of Three. Difficulties and misunderstandings about the application of the law to payment for medical care for pensioners are sure to occur unless physicians are prompt about making explicit arrangements with responsible local officials.

No Exceptions

The special session that is now terminating was marked by several attempts to make legislative exceptions in behalf of individuals to the provisions of the Basic Science Law.

Such individual exceptions carry a serious threat to the vitality of the Basic Science law. The importance of keeping legislators informed of this danger is obvious. The Legislative Committee is to be complimented on the effectiveness with which it prevented the passage of all such legislation at this session.

Short of Cash

The relief problem in Minnesota is currently complicated by a serious deficit in funds.

It is estimated by the relief officials and confirmed by a House investigating committee that \$16,000,000 will be needed to take care of the direct relief load in Minnesota this year.

No method of lining up available funds and prospective appropriations could be made to add up to the total amount, however, and the legislature threatened to adjourn as this issue went to press, \$3,750,000 short of the total amount needed.

The investigating committee recommended that \$3,000,000 of the \$5,000,000 appropriation which becomes available July 1, be made available immediately to care for the current budget of the SERA. Without this action, complete cessation of all direct state relief faced relief offices on February 1.

Obviously, the status of direct relief in Minnesota is precarious and uncertain. It will be necessary to get additional federal aid, in the

opinion of most legislators, to meet the 1936 budget. SERA may be forced to close down entirely or drastically to cut its disbursements at any time.

Physicians everywhere, whether in counties that have joined in the state relief program or not, will do well to keep in constant touch with the trend of relief affairs and with their local county and relief officials.

This is the job of the Contact Committees. Their mission was never so important as *now*.

New Assistant to the Secretary: R. R. Rosell

Mr. R. R. Rosell, formerly field representative of the National Food Bureau, and more recently, Director for the WPA, has joined the headquarters staff of the Minnesota State Medical Association as assistant to the secretary.

At one time assistant to the regional director of the United States Veterans Administration, and Director of Rehabilitation and Re-education for the Minnesota Public Health Association, Mr. Rosell is experienced in organization work and thoroughly familiar with government and state agencies and their officials.

The Minnesota State Medical Association will unquestionably find itself obliged to co-operate much more closely than ever before, as a result of social security legislation and relief activities in general, with various public agencies.

The selection of Mr. Rosell to assist in the conduct of this phase of the organization's activities is therefore especially appropriate. He will, as Secretary E. A. Meyerding directs, keep in close touch with negotiations in all parts of the state with county commissioners and relief officers in the conduct of medical care for the indigent and unemployed and do much, it is hoped, to facilitate medical coöperation in the New Deal program for 1936.

Foundation Studies

Various individual physicians throughout the state have received letters from the American Foundation Studies in Government during the last few months.

These letters courteously requested the physicians' informal views on present methods

of medical practice and the degree to which medicine is now fulfilling its functions.

The names on the letterhead, including Karl T. Compton, Massachusetts Institute of Technology, as president; Curtis Bok, chairman; Robert A. Millikan, Thomas W. Lamont, James D. Mooney, Roscoe Pound, Mrs. Ogden Reid, Elihu Root, Hugh L. Cooper, Dr. Truman G. Schnabel, Bishop William Scarlett, Mrs. F. A. Vanderlip, John G. Winant, Elizabeth F. Read with Esther Everett Lape as member in charge were impressive.

Purposes

Investigation of the purposes of the Foundation revealed the following which is quoted from a report made by Dr. R. G. Leland, Chicago, Director of the Bureau of Medical Economics, after a personal interview with Miss Lape, member in charge.

Miss Lape said:

"The Foundation has nothing to prove or to demonstrate to the Foundation Board.

"Neither the Foundation members nor the staff in charge have any preconceived notions, plans, programs or propaganda.

"The study is to be confined to an endeavor to secure from practicing physicians statements of the factors involved in medical practice, opinions as to the extent to which the practice of medicine is fulfilling its functions, and expressions of the manner in which deficiencies or shortcomings in medical practice may be corrected if, and where, found.

"The Foundation desires to secure honest, complete and well considered statements and that the correspondents' names will be withheld when desired."

Anxiety Expressed

Miss Lape expressed several times, according to Dr. Leland, her anxiety over the activities of the small group in Washington which is attempting to change completely the existing social order. She expressed feelingly deep concern over the possibility of extending these reforms into the field of medicine. She was frank in expressing her opinion that these reforms might be merely a passing fancy, but if applied to medicine would result in a much greater social disaster than in other fields.

Dr. Leland was careful to note, however, that the opinions expressed were not his.

The Foundation has engaged in other studies including the Press Poll of Views of the World Court, and Views on Russian Recognition.

Its sponsors disclaim for it any objective ex-

cept to present in an educational and informative way actual, uncolored facts and opinions.

Founder

The Foundation was established by the late Edward Bok of the Curtis Publishing Company in 1925. Its total endowment in 1930 was \$2,000,000. Its Board of Directors is preponderantly conservative, barring Bishop Scarlett who, in spite of his affiliation with the Protestant Episcopal Church, is sometimes referred to as a radical.

The sustaining activity of the Foundation today is said to be a study of parliamentary government here and abroad.

Washington's "Medical Factories"

A large number of plans for care of the sick by pre-payment methods are being tried out in the state of Washington.

Some of them are under medical society management. Others are individual undertakings, like the one operated by Dr. A. W. Bridge in Tacoma. Dr. Bridge had some interesting Associated Press publicity on his organization recently.

According to a breezy story carried by the Associated Press, Dr. Bridge has adapted "big business" tactics to his practice. He has a "medical factory" with a staff of thirty doctors and 10,000 patients on contract to pay \$1.50 a month. He operates his own hospital, drug store commissary and garden and reaps a profit.

Headed by Dr. Hopkins

Dr. Lewis A. Hopkins, brother of Relief Administrator Harry Hopkins, is president of another pre-payment service plan. This one is sponsored by the Pierce County Medical Society. Contracts for the latter also cost the patient about the same amount though a similar amount is also paid by the patient's employer. This Pierce County Industrial Medical Bureau also had its share of mention in the same story as did another organization owned by a group of doctors.

Experiments of this type flourish on the North Pacific Coast. Doctors justify them on the ground that lumber companies and other commercial organizations have long had such schemes and that the latter were full of abuses.

The commercial organizations forced the issue.

Not Happy

That all Washington physicians are not happy over the state of affairs is evidenced by a letter printed in a recent issue of Oregon's "Medical Reporter" from Dr. Alexander Hamilton Peacock, of Seattle, former president of the Washington State Medical Association, and former chairman of the association's Medical Economics Committee.

Says Dr. Peacock:

"When president of the Washington State Association and chairman of the Economics Committee, I went out of my way to make a study of this subject of taking care of the sick by mass methods. We have, of course, the various European systems to study and to observe. These I will not comment on as you are familiar with their good points and their weak ones.

Fees too Low

"Our own County Medical Service Bureaus, however, are another thing altogether. Here we can observe their workings out under our eyes and see the general trend. In the first place, they are taking care of the sick at a fee much below the actual cost. Good medical service cannot be given at any such figure. It means that the costs are coming out of the doctors' income. In the second place, they are educating the public to a very low medical insurance fee. The laity believe that good medical service can be obtainable at such a figure, if many of the well-known doctors and surgeons enter into such an agreement with them. This is establishing a low basis for a general insurance plan.

Spreads to Large Incomes

"In the third place, this plan initiated by organized medicine, instead of being limited to the industrial hazards, is rapidly spreading until it is covering a large number of the incomes of the county. It was, originally, intended to keep out of the field commercial hospital associations and some of the doctors who are considered to be on the outside of ethical medicine. Instead of driving them out they have increased the number of their contracts and the bureau itself has been obliged to get its clients from an entirely different field, that is, clerks and the white-collared class. While decrying state or federal medicine, they have laid a beautiful plan for the general medical care of the whole community. Of course, this is driving out private practice and everybody who possibly can is coming under the bureau service. The ultimate end of such a policy is quite apparent to everyone.

For Old Method

"My observations are that the service bureau is carried on under the idea that it is necessary, that a

great many of the men are heartily out of sympathy with it and are afraid of its ultimate results, that if they could possibly do so they would withdraw from the bureau but are afraid on account of political reasons. The present plan in most of the bureaus is the modified panel system with the doctors carrying the entire load of hospitalization as well as medical service. The question of the bureau is analogous to the great problem before the country of those who believe in social security and those who believe in the competitive profit system. There can be no compromise of the two, it must be either one or the other. Personally, I am for the old method of competition, based on personality and good medical service."

More For Their Money

From a recent United States News Column signed by Derek Fox:

"Walton H. Hamilton, President's Adviser on Consumer Problems and Director of the Government's new Consumers' Division, has formed a 'Consumers' Cabinet' of nationally known experts on economic and consumers' problems and is rapidly shaping plans for getting the buying public more for its money.

"One of the aims of the organizations is said to be in the field of medical costs to the average citizen. Suggested by Mr. Hamilton was a family budget or insurance plan for paying doctors' bills.

"This does not mean that the doctor shall receive less," he explained, pointing out that if families lay aside a certain amount either through a special budget or insurance for a special purpose, the number of those who can pay their doctors' bills will be larger and therefore the cost to the patient probably will be curtailed.

"Already the United States Public Health Service has started its house-to-house canvass in 19 states to ascertain the adequacy of health facilities, the extent to which they are used and other information.

"Findings from this survey will be analyzed by the 'Consumers' Cabinet'."

Vitamin C and Infection

Few more cogent examples of the justification for the painstaking and deliberate methods of scientific research have developed than is shown in the story of cevitamic acid (vitamin C). Once the evidence had been obtained that a deficiency in this food factor could be produced at will in experimental animals, great effort was made to find sources of it in nature. Concentrates were made from the richest of these and, when they had been sufficiently purified, the chemical constitution was at length established. The goal of this study was reached in 1933, when the synthesis of cevitamic acid was achieved. Perhaps the story is the more thrilling because of the long history of the tacit

Minnesota State Board Of Medical Examiners

Saint Paul Abortinist Sentenced to Four Years at Shakopee

State of Minnesota vs. Della Mostert

Della Mostert, fifty-six years of age, 1785 E. Maryland Street, Saint Paul, Minnesota, was sentenced on January 7, 1936, to a term of not to exceed four years at hard labor at the Woman's Reformatory at Shakopee, following her plea of guilty to an indictment

charging her with the crime of abortion. The sentence was imposed by the Honorable R. A. Walsh, Judge of the District Court for Ramsey County.

Mrs. Mostert, who has no medical training or education whatever, but who for some time has been doing work as a practical nurse and operating a rest home, admitted to Judge Walsh that she



MRS. MOSTERT

had been engaged in this illegal work for the past seven or eight years. In the present case an eighteen-year-old girl went to the home of Mrs. Mostert on November 15, 1935, for the purpose of having an abortion performed. Arrangements had been made previously by a young man who paid Mrs. Mostert the sum of \$45.00. Within thirty-six hours after the performing of the abortion by Mrs. Mostert, the girl was dead. The cause of death was given as gas bacillus. A complete postmortum examination was not made and it was decided to permit Mrs. Mostert to enter a plea of guilty to the crime of abortion rather than to try her on a charge of manslaughter. The Grand Jury in indicting Mrs. Mostert, returned two indictments; one for manslaughter in the first degree and one for abortion.

For some time reports have been coming to the State Board of Medical Examiners in reference to Mrs. Mostert. The Board did not feel justified, however, in presenting the facts to the County Attorney's office until the present case. This case is a perfect example of the damage done by an ignorant quack. When the girl showed signs of becoming seriously ill Mrs. Mostert applied a plaster to her side. Finally a physician was summoned, but the girl was dead.

The State was represented by Mr. James Lynch and Mr. William F. Desmond, assistants to Mr. M. F. Kinkhead, County Attorney. Mrs. Mostert was represented by Mr. George L. Siegel.

recognition of human scurvy as a deficiency disorder. The value of cevitamic acid as a preventive and cure of human and experimental scurvy has been demonstrated repeatedly. Jungblut and Zwemer have recently reported that diphtheria toxin is inactivated by vitamin C in vitro. Furthermore, cevitamic acid seems to be able to protect guinea-pigs against the fatal outcome of diphtheria intoxication. Similar studies of King and Menten have demonstrated the marked influence of vitamin C in promoting the resistance of guinea-pigs to diphtheria toxin. These conclusions seem to indicate that cevitamic acid bears a relation to immunologic reactions.—(*J. A. M. A.*, November 16, 1935, p. 1609.)

OBITUARY

Justus Ohage
1849-1935

DR. JUSTUS OHAGE of Saint Paul died at his home, December 26, 1935, at the age of eighty-six.

Dr. Ohage, son of Dr. Georg Ohage, whose father was also a doctor, was born in Hannover, Germany, October 13, 1849. While attending the gymnasium in that city, his spirit of adventure led him, at the age of fifteen, to make a run-away trip to the United States to join the northern forces in the Civil War. As a wounded soldier in the hospital at City Point, Virginia, on the occasion of a visit to the institution by Abraham Lincoln, he received, from the President, a handshake and an expression of thanks for his bravery and service.



DR. JUSTUS OHAGE

Returning to Hannover he pursued his studies, which were again interrupted when he served as a stretcher bearer in the Franco-Prussian war of 1870. After sailing before the mast he again returned to the United States to serve as a medical assistant on the construction crew of the Topeka Atchison railroad.

Later he made a hunting trip with his brother, Georg, to the wilds of the Northwest, where he was later to make his home. In 1876, he returned to Missouri, and it was there that he met a medical student, Thomas Ensor, who had similar tastes in outdoor life. Thomas Ensor was the son of Dr. Sidney Ensor, a graduate of Guy's Hospital, London, and on May 10, 1877, Dr. Ohage married Dr. Ensor's daughter, Augusta.

Pursuing his medical studies at the University of Missouri, Dr. Ohage received his medical degree in 1880. Taking his family with him, he spent a year in intensive post-graduate work at Göttingen, Kiel, Berlin, Edinburgh and London.

Dr. Ohage began practice in Saint Paul in 1881, in offices at Seventh and Wacouta Streets, shared with Dr. Parks Ritchie and Dr. Edward Spencer.

As an illustration of Dr. Ohage's bold spirit, he performed the first cholecystectomy in the United States, at St. Joseph's Hospital, September 24, 1886. The patient survived forty-three years following the operation, and in 1930 Dr. Ohage received tribute for his pioneer work in surgery from the International Postgraduate Medical Association of North America.

Dr. Ohage was president of the Ramsey County

Medical Society in 1889 and 1890, president of the Minnesota State Medical Association in 1895, a charter member of the Minnesota Academy of Medicine, clinical professor of surgery at the University of Minnesota from 1890 to 1899 and a member of the Imperial Surgical Society of Berlin.

In 1899, Dr. Ohage became health officer of Saint Paul. Against vigorous opposition he pursued a spirited program of reform. Pure food laws were enforced, birth and death certificates were filed in an orderly system and compulsory vaccination in the schools was adopted. He even succeeded in abolishing the smoke nuisance. Undoubtedly, as a result of his vigorous policies, Saint Paul was declared the healthiest city in the world at the Saint Louis World's Fair in 1904, and Dr. Ohage was awarded a medal for having made it so.

As an illustration of Dr. Ohage's public spirit, he presented Harriet Island to the city for use as a recreation park and bathing beach. The subsequent pollution of the river prevented the development of the island, but it is to be hoped that the new sewage disposal plant now under construction will permit the realization of Dr. Ohage's plan.

In 1918, Dr. Ohage resigned as health officer and returned to private practice, which he continued until he gave up his office a few years ago on account of physical infirmities.

Dr. Ohage was an ardent lover of the great outdoors and a great hunter and fisherman. He wrote his adventures in a book entitled "Sixty years With Rod and Gun" which was privately printed and distributed to friends.

Surviving are three daughters, Ada and Louise Ohage of Saint Paul, Mrs. Emil S. Geist of Minneapolis, and one son, Dr. Justus Ohage, Jr., of Saint Paul.

Floyd S. Kidd
1883-1935

DR. FLOYD S. KIDD, member of the medical staff at the Veterans' Hospital, Minneapolis, died suddenly December 30, 1935, at the age of fifty-two.

Dr. Kidd was born in Glenn Haven, Wisconsin, in 1883, where he received his preliminary education, graduating from the University of Iowa medical school. He practiced at Mitchell and Woonsocket, South Dakota, until he joined the medical corps of the Army at the outbreak of the war. Following the war he resumed practice until 1928, when he joined the staff of the Veterans' Bureau.

Dr. Kidd is survived by his widow, two daughters, Mrs. Iowa M. Kraft, Saint Paul, and Miss Helen M. Kidd, Minneapolis; his mother, Mrs. Florence Kidd of Mitchell, S. D., and a brother, J. E. Kidd of Tacoma.

Perry Harris Munger

1861-1935

PERRY HARRIS MUNGER was born February 2, 1861, at Piqua, Ohio. He was graduated from the University of Michigan, in 1889, and had practiced in Minnesota since 1892, at St. James, Nicollet and St. Paul Park. Dr. Munger had suffered a long illness and was not in practice at the time of his death, which occurred September 8, 1935. He is survived by his widow, three sons and a daughter.

John Moresby Rains

1850-1935

DR. JOHN M. RAINS, Willmar, died at his home November 10, 1935, in his eighty-fifth year.

Dr. Rains was born November 23, 1850, in Toronto, Canada, the son of John and Maria (McCord) Rains. He received his early education at the Model and Heber Grammar Schools conducted privately by the Masters of the English (Episcopalian) Church. He then entered a military school for cavalry officers, becoming a member of the Governor General's Horseguards.

Studying medicine at Victoria College, later affiliated with the present University of Toronto, he graduated in 1870 at the age of twenty, too young to practice in Canada. After travelling in the United States, he located in the State of Michigan. In 1877 he married Frances Augusta Burnett of Jackson, Michigan, and in 1879 moved to Willmar, Minnesota, at the suggestion of another pioneer physician, Dr. E. S. Frost. He remained there in active practice continuously until a few years before his death.

Two daughters were born to Dr. and Mrs. Rains in Willmar: Helen Gertrude (Mrs. Harry L. Beckjord) of Duluth, and Ethel Isabelle (the late Mrs. A. W. Cleveland) also of Duluth. He leaves one granddaughter, Georgiana Cleveland, and two grandsons, Warner Rains Cleveland and Philip Rains Beckjord of Duluth.

Dr. Rains acted as pension examiner from 1880 on and held the office of Health Officer of Willmar from 1890 to 1933. He was also chairman of the Civilian Relief, Kandiyohi Chapter of the American Red Cross, from 1917 to 1925, having been a member of the Board of Directors of that organization from its origin in 1917 to 1927. He was also a charter member of the Willmar Chamber of Commerce, a member of the Masonic Lodge and Kiwanis Club and served on the City Park Board from 1910 to 1914.

Dr. Rains was a member of the Kandiyohi-Swift County Medical Society, the Minnesota State and American Medical Associations. He led a long and useful life. He was a great leader and lover of flowers and his hobby was the cultivation of fine roses.

Emory C. Rebman

1885-1936

DR. EMORY C. REBMAN, president of the Austin Clinic since 1931, died at the Worrell Hospital, Rochester, January 7, 1936, from pneumonococcus meningitis complicating an ear infection.

Dr. Rebman was born January 18, 1885, at Forrestone, Illinois. At the age of six the family moved to Pipestone, Minnesota, where he attended grade and high school. He studied medicine at Ann Arbor, taking his final year at Northwestern University, Chicago. He received his medical degree in 1909, and was married the same year to Margaret Cawley of Pipestone.

First practicing at Truman, Minnesota, for two years, Dr. Rebman moved to Austin in 1912 to be associated with the late Dr. C. F. Lewis. In 1919 they founded the Austin Clinic with Dr. C. C. Allen and Dr. W. B. Grise. Later the clinic built its present building. On the death of Dr. Lewis in 1931, Dr. Rebman was elected president of the group. As a charter member of the local Rotary Club Dr. Rebman was active in local affairs and as a member of the staff of St. Olaf Hospital and at one time chief of staff he contributed much to the welfare of the hospital.

The Bactericidal and Bacteriostatic Effects of Mercurochrome

The comparative evaluation of antiseptics involves many difficulties. Adequate standard methods have not yet been developed; consequently studies in this field by different workers are rarely comparable. This has led to great confusion and much controversy. An article by Justina H. Hill of the Brady Urological Institute (whence mercurochrome originated) concerning the action of mercurochrome in comparison with some other preparations on normal human skin and in infected wounds in animals, appears in *The Journal*, July 13, 1935, p. 100. Miss Hill presents an extensive series of experiments on the comparative bactericidal and bacteriostatic effects of 2 per cent aqueous and 2 per cent acetone-alcohol-aqueous solutions of mercurochrome and of tincture of iodine applied to normal human skin. She concludes from her investigations that the acetone-alcohol-aqueous solution is superior for this purpose to the aqueous preparation, and that the acetone-alcohol-aqueous solution, under the conditions of her tests, exerted greater bacteriostatic effects than 7 per cent tincture of iodine. Comparative studies on the effects of the two preparations of mercurochrome, 7 per cent tincture of iodine, tincture of merthiolate, aqueous solution of merthiolate, tincture of metaphen, neutral acriflavine in salt solution, and hexylresorcinol solution, on subcutaneous wounds inoculated with *Staphylococcus aureus*, indicated that the 2 per cent aqueous solution of mercurochrome was superior to all the others in reducing the number of organisms and in producing the least interference with phagocytosis. It appears from other studies which have been made that most workers have found mercurochrome to be a relatively weak antiseptic. This is not contradicted by the data presented by Miss Hill; the results of her investigations, so far as they appear to be fully valid, supplement rather than conflict with those of the other studies. It must be appreciated that the alleged superiority of any antiseptic, and, in this case, of mercurochrome, is dependent on the conditions under which this superiority was demonstrated. The consensus appears to be that mercurochrome is a moderately active antiseptic; it is relatively non-irritant and it has a certain definite but quite limited usefulness in the prevention and treatment of certain infections. (*J. A. M. A.*, July 13, 1935, p. 123.)

OF GENERAL INTEREST

Dr. George D. Doroshow has opened an office at 1035 Lowry Medical Arts Building, Saint Paul, with practice limited to pediatrics.

* * *

Dr. James C. Masson was recently appointed chief of the surgical staff of the Mayo Clinic to succeed the late Dr. Edward Starr Judd.

* * *

F. Manley Brist, attorney for the Minnesota State Board of Medical Examiners, is recovering from pneumonia at the Miller Hospital, Saint Paul.

* * *

Dr. O. J. Hagen, for the past five years a Regent of the University of Minnesota, was recently elected president of the Association of Governing Boards of State Universities.

* * *

Dr. J. Allen Wilson, formerly with the Earl Clinic, has opened offices at 836 Lowry Medical Arts Building, Saint Paul, where he will limit his practice to internal medicine, with special reference to gastro-enterology.

* * *

Dr. Benjamin B. Souster has opened an office at 836 Lowry Medical Arts Building, Saint Paul, for the practice of internal medicine. Dr. Souster has been associated with the Earl Clinic for a number of years.

* * *

Dr. H. M. N. Wynne of Minneapolis spoke before the Interurban Academy of Medicine (Superior and Duluth) at the regular meeting, January 15. He spoke upon the subject, "Remarks Concerning Hysterectomy."

* * *

Dr. Edward L. Tuohy addressed a meeting of the Gogebic County Medical Society, Ironwood, Mich., on the evening of January 21. He discussed, "The Bone Marrow and Its Relation to Certain Hematopoietic Disorders."

* * *

Dr. Gage Clement, roentgenologist at St. Mary's Hospital, Duluth, is convalescing from a serious pneumonia with an empyemic complication. His numerous friends will be pleased to know that he is assured an early complete recovery.

* * *

At the Camp Release Medical Society meeting in Dawson, Minnesota, on January 9, Dr. Myron O. Henry of Minneapolis spoke on "Legal Pointers," and Dr. W. A. Fansler of Minneapolis spoke on "Injection Treatment of Rectal Diseases."

* * *

Dr. J. W. Edwards recently opened offices at 1149 Lowry Medical Arts Building, Saint Paul. Dr. Edwards practiced at South Saint Paul for a number of years before moving to Chicago, where he has been in general practice for several years.

* * *

St. Luke's Hospital, Duluth, held its annual banquet

for its staff, with election of officers, on the evening of January 16. The address of the evening was given by Lloyd Gillmett, rector of St. Paul's Episcopal Church. Dr. D. W. Wheeler was elected Chief of Staff.

* * *

Dr. W. R. Bagley of Duluth, former president of the Isaac Walton League, together with Mr. Valentin Saxby of the Arrowhead Association, have been appointed delegates from Minnesota to a forthcoming "Conference on Wild Life Conservation" at Washington, D. C. Some of Dr. Bagley's friends have been asking him whether this assignment includes the genus homo sap!

* * *

Correction.—In the article by Dr. H. M. Weber, entitled, "Roentgenologic Manifestations of Diseases which Have Dysentery as a Prominent Symptom," which appeared in MINNESOTA MEDICINE, page 23, January, 1936, the following errors occurred: (1) page 25, left-hand column, line 28, should read "and tuberculous intestinal processes are not *infrequently* encountered;" (2) page 29, left-hand column, line 11 should read, "there are no positive roentgenologic signs of *benignancy*."

* * *

The American Association for the Study of Goiter again offers the Van Meter Prize Award of \$300.00 and two honorable mentions for the best essays submitted on the goiter problem. This award will be made at the discretion of the Society at its next annual meeting to be held in Chicago, Illinois, on June 8, 9, and 10.

The competing manuscripts, which should not exceed 3,000 words in length, must be presented in English and a typewritten double spaced copy sent to the Corresponding Secretary, Dr. W. Blair Mosser, 133 Biddle Street, Kane, Pennsylvania, not later than March 1, 1936. Manuscripts received after this date will be held for competition the next year or returned at the author's request.

* * *

Warning

The Minneapolis police hold a warrant for the arrest of a man by the name of Olaf Edwardson, wanted for forgery. He has imposed on a number of physicians throughout the state and, if encountered, any police officer or sheriff, the State Bureau of Criminal Apprehension of the Minneapolis or Saint Paul police, should be notified.



OLAF EDWARDSON

The man is described as: Age 40; height five feet seven inches, weight 155 pounds, medium dark chestnut hair, bald, medium dark blue eyes, complexion medium, of Norwegian descent; occupation, barber.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for February

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 10:00 A. M. every Monday, over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

February 3—Value of Colonic Irrigations.

February 10—Toothache.

February 17—Diet and Health.

February 24—Care of the Eyes.

Northwest Regional Conference

Following is the program for the Northwest Regional Conference which will be held in Chicago at the Palmer House, February 16, this year:

8:30 A. M.—Breakfast. (Red Lacquer Room.)

9:30 A. M.—Registration.

10:00 A. M.—Morning Session.

1. "The Social Security Act and Its Relation to The Medical Profession."

T. V. McDAVITT, American Medical Association, Chicago.

Discussion opened by A. D. McCannel, M.D., Minot, North Dakota, and Chas. B. Reed, M.D., Chicago.

2. "Reciprocal Relations Between State Medical Societies."

HAROLD M. CAMP, M.D., Monmouth, Illinois.

Discussion opened by A. S. Rider, M.D., Flandreau, South Dakota, and F. S. Crockett, M.D., LaFayette, Ind.

12:30 P. M.—Luncheon (with the compliments of the Illinois State Medical Society).

President's Address:

OLIVER J. FAY, M.D., Des Moines, Iowa.

Election of Officers for 1937.

Selection of meeting place for next annual meeting.

Introduction of guests.

2:00 P. M.—Afternoon Session.

1. "Standardization of the Activities of the Committees on Medical Economics of Mid-West and Northwest."

F. L. LOVELAND, M.D., Topeka, Kansas.

Discussion opened by E. A. Meyerding, M.D., St. Paul, Minnesota, and W. H. Marshall, M.D., Flint, Michigan.

2. "Interprofessional Relations in the County."

FRED MOORE, M.D., Des Moines, Iowa.
Discussion opened by L. W. Larson, M.D., Bismarck, North Dakota, and J. M. Hayes, M.D., Minneapolis, Minnesota.

Papers will be limited to twenty minutes each, and discussions to ten minutes; at the completion of same, papers will be open for general discussion.

Kindly address any inquiry to the Secretary, E. S. Hamilton, M.D., Kankakee, Illinois.

American College of Surgeons Sectional Meeting

The American College of Surgeons 1936 Sectional Meeting in Omaha, Nebraska, will be held on Wednesday, Thursday, and Friday, March 11, 12, and 13. Headquarters will be at Hotel Paxton.

Participating states: Nebraska, Iowa, Wyoming, North Dakota, South Dakota, Minnesota, Kansas, and Colorado.

A Committee on Local Arrangements is headed by Dr. Herman F. Johnson as chairman, and Dr. William L. Shearer as secretary.

Some of the distinguished visitors who will be present on this occasion are: Dr. George Crile, Cleveland, Chairman, Board of Regents, American College of Surgeons; Dr. A. W. Adson, Rochester, Neurosurgeon, Mayo Clinic; Dr. Frank E. Adair, New York, Attending Surgeon, Memorial Hospital; Dr. Charles L. Scudder, Boston, Consulting Surgeon, Massachusetts General Hospital; Dr. Robert H. Kennedy, New York, Surgical Director, Beekman Street Hospital; Dr. Frederic A. Besley, Waukegan, Professor of Surgery, Northwestern University Medical School; C. C. Little, Sc.D., New York, Managing Director, American Society for the Control of Cancer; Dr. M. T. MacEachern and Dr. Bowman C. Crowell, Chicago, Associate Directors, American College of Surgeons; and Robert Jolly, Houston, Superintendent, Memorial Hospital and Past President, American Hospital Association.

A cordial invitation to attend this most interesting meeting is extended not only to the Fellows and hospitals of the various states included, but to the entire medical profession at large.

State Meeting

Six famous out-of-state medical men have already consented to speak before the 83rd annual three-day session of the Minnesota State Medical Association to be held in Rochester, May 4, 5 and 6.

They are Dr. Willis F. Manges, Philadelphia radiologist, who will deliver the third annual Russell D. Carman lecture under Minnesota Radiological Society auspices; Dr. Elliott P. Joslin of Boston who will talk on diabetes; Dr. F. A. Coller, of Ann Arbor, Michigan; Dr. Donald Guthrie, of Sayre, Pennsylvania; Dr. J. Tate Mason, Seattle, president of the American

Medical Association, and Dr. Olin West, of Chicago, the association's general manager.

Invitation has also gone to Dr. Max Cutler, Micheal Reese Hospital, Chicago, to deliver the Citizen's Aid Society lecture on cancer.

As the program is now arranged, the first two hours of each day's program from 8:30 a. m., to 10:30 a. m., will be devoted to clinics to be given by Rochester men at St. Mary's hospital. The half hour from 10:30 to 11:00 each morning will be devoted to inspection of the scientific and technical exhibits to be held at St. Mary's Nurses Home. The hour from 11 to 12 each day will be given over to lectures by the visiting headliners, also the first hour after lunch. These lectures and the afternoon papers will be given in the hall at the nurses' home.

There will be another half hour for the exhibits in the afternoon, from 2:45 to 3:15 p. m., followed, each day, by a series of papers exclusively by Minnesota men.

The usual evening medical economics meeting will be held Monday evening with Dr. West, Dr. Mason and Mrs. J. W. Robb of Detroit, representing the Women's Auxiliary, as guest speakers.

An innovation which is to take the form, according to present plans, of a crime study meeting will be substituted for the usual banquet meeting Tuesday night.

This meeting will be held at the Armory and, among speakers already invited, are famous "G-Men" from Washington, including ballistic experts, finger print experts and others. A massive exhibit of the recent brilliant work of the department of Justice will be sent to the meeting by Mr. J. Edgar Hoover, of the department. This exhibit will be at the armory at the time of the meeting and may also be on display for the public at appropriate hours.

Business meetings of the association, including Council and House of Delegates' meetings, will start at the Kahler Hotel, Sunday, May 3.

County Officers' Conference

Saturday, February 29, is the date chosen for the annual County Officers' Conference to be held at the Lowry Hotel in Saint Paul.

Sessions will open at 8 a. m., with a breakfast and Round Table discussion. Since the first of the breakfast meetings, held two years ago, these informal discussions have proven to be one of the most valuable of the day's sessions, and all officers are especially urged to be there.

Important among the subjects to be discussed throughout the day are Social Security, and the Social Security Act with its probable effects upon public health and the practice of medicine; Medical Relief for the Indigent and Low Income Group; the Chronic Disease Survey; the High School Debates and the Special Session of the Legislature, recently adjourned.

Dr. W. W. Bauer, director of the Bureau of Public Health and Instruction of the American Medical Association, will come from Chicago to discuss the Social

Security program. Among other important guest speakers for the day's session are Mr. Victor Christgau, WPA Administrator for Minnesota, and Mr. B. E. Youngdahl, director of SERA.

Narcotic and Liquor Law Violations, Malpractice, Workman's Compensation, Credit and Collection Bureaus and the Dakota County Plan are among the subjects to be considered informally at the breakfast session.

The morning program will include also a "Secretary's Travelogue" by Dr. M. C. Piper, Rochester; "My Experience as a Full-Time Secretary," by Mr. J. H. Baker, executive secretary, Hennepin County Medical Society; a report on the legislative session by Dr. L. L. Sogge, Windom, chairman of the Committee on Public Policy and Legislation, and also a report on the Northwest Regional Conference which is to be held this month in Chicago by Dr. W. F. Braach, chairman of the Committee on Medical Economics, Rochester. A report on experiences throughout the state with high school debates on state medicine, subject for the current year, will complete the morning program.

The afternoon will be devoted to the Social Security program with Dr. A. J. Chesley, State Health Officer, following Dr. Bauer as speaker, and a summary by Dr. Sogge; also Medical Relief and the Chronic Disease Survey with Dr. Bauer, Dr. T. H. Sweetser, Minneapolis, chairman of the State Health Relations Committee, Mr. Christgau, Mr. Loungdahl, Dr. E. A. Meyerding, Saint Paul, secretary of the state association, and Mr. R. R. Rosell, assistant to the secretary, as speakers.

Dr. W. W. Will, Bertha, president of the State Medical Association, will preside at the noon luncheon and the afternoon sessions. Dr. Meyerding will preside at the breakfast and morning sessions.

Mississippi Valley Medical Society

The second annual meeting of the Mississippi Valley Medical Society will be held at the Hotel Burlington, Burlington, Iowa, September 30, October 1 and 2, 1936.

The first meeting, held at Quincy, Illinois, last October, was most successful. There were 300 registered from ten states, with forty-eight papers read by thirty-six clinicians. Plans are under way to augment the present membership and to make the Burlington Assembly, in 1936, the largest medical meeting ever held in southeastern Iowa. The board of directors, at their recent meeting, voted to continue the \$5.00 fee for membership and first year's dues; \$2.00 for annual dues, and \$3.00 registration fee for non-members at the annual meeting.

Clay-Becker County Society

The annual officers of the Clay-Becker County Medical Society are: President, J. W. Duncan, Moorhead; vice president, A. R. Ellingson, Detroit Lakes; secretary-treasurer, L. H. Flancher, Lake Park.

Clarence Martin Jackson Lectureship

The third annual address in the Clarence Martin Jackson Lectureship of Phi Beta Phi Medical Fraternity will be given by Dr. Russell L. Haden of The Cleveland Clinic, at 8:15 o'clock, on Wednesday, February 5, in the Medical Sciences Amphitheater, at the University of Minnesota. Dr. Haden's subject will be "The Human Red Blood Cell." All who are interested are invited, by the fraternity, to attend.

Rice County Joint Meeting

A joint dinner meeting of the Rice County Medical and Dental Societies was held Thursday, January 23, at 6:30 p. m., in the Faribault Hotel for the consideration of the Social Security Act. Dr. C. E. Rudolph, of the University of Minnesota, was the speaker. Dinner was served at 6:30 p. m.

C. J. PLONSKE, *Secretary*.

Washington County

Officers of the Washington County Medical Society have arranged for four lectures on fractures for the benefit of members. Some sixty invitations to attend the lectures have been extended to physicians located in Minnesota and Wisconsin, in the vicinity of Stillwater.

The first lecture, on Fractures of the Hip, was given at the regular meeting, January 4, 1936, by Dr. A. A. Zierold of the University.

WOMAN'S AUXILIARY

MRS. F. J. ELIAS, *President*, Duluth, Minn.
MRS. L. W. BARRY, *Editor, Press and Publicity*,
2193 Sargent Ave., St. Paul, Minn.

The radio plaque offered by the Woman's Auxiliary of the Minnesota State Medical Association in the fifth annual high school public speaking contest in connection with the Christmas Seal campaign was won by the Worthington High School. The winning talk was broadcast by Miss Ruth Mixa of the school, one of the ten students in the final WCCO broadcasts. The contest is conducted annually by the Minnesota Public Health Association with the coöperation of the Woman's Auxiliary, and WCCO.

Announcement of the winner of the plaque was made over WCCO by Mrs. F. J. Elias of Duluth, president of the Woman's Auxiliary. The ten gold medals offered by the Auxiliary to the students whose outstanding talks won them an opportunity to broadcast were awarded to the following on the occasion of their broadcasts: Ruth Mixa, Worthington High School, finalist in the contest; Ethel Watson, Johnson High School, St. Paul; Katherine Riikols, Memorial High School, Ely; Mary C. Waskuwich, Bethlehem Academy, Faribault; Ted Boer, Vocational High School, Minneapolis; Ann Mary Chidester, Stillwater High School; Verna Thysell, State Teachers' College High

School, Moorhead; Helen King, Randolph Public School; Myrna Anderson, Greenway Junior High School, Coleraine; Patricia Sanger, Deer River High School.

More than 100 talks were entered by Minnesota high schools in the state contest. Preliminary local contests were conducted in all of these schools, and in a number of counties the County Medical Auxiliary offered awards. It is estimated that approximately ten thousand talks on the subject, "Fight Tuberculosis with Modern Methods," were written in this contest. Awards for the greatest effort in connection with the contest were as follows: First, a drill press for the manual training department, Detroit Lakes High School; second, a jig saw, to the Redwood Falls High School.

When it is realized that in addition to the research work done by the students and the preparation of their papers, talks were presented in every community to local audiences before they were sent to the state contest, and the daily radio broadcasts of the winning talks over a period of ten days reached thousands of people, the widespread educational value of the contest is evident.

The educational plan, which originated in Minnesota and which has been sponsored by the Woman's Auxiliary since its inception five years ago, has now been adopted in many states, among them the neighboring states of Wisconsin and Iowa.

* * *

The second week in November found Mrs. F. J. Elias in Chicago attending a Session of the Board of Directors of the Auxiliary to the American Medical Association. In the autumn every year, this Board has a one-day session, and the accumulated problems are brought before the group by the members. Much help is given to all by the national chairmen, and the exchange of ideas and programs of work are mutually helpful. This year there were thirty-two members present. The session was called to order at ten o'clock, Mrs. Rogers N. Herbert, president, presiding. A great deal of time was given over to the new Treasurer's Receipt Blanks introduced by the treasurer, Mrs. Eben J. Carey of Milwaukee. Along with this topic, a clarification of budgets and finances in general was indulged in. Luncheon was a social event, the Chicago Auxiliary entertaining the group in their gracious way. There were one hundred and fifty women at this luncheon. The afternoon meeting was called to order at 1:30. The reports and suggestions from national chairmen, and state reports filled the time. These were instructive and helpful.

Besides Mrs. Elias, Mrs. E. M. Hammes, president-elect, and Mrs. James Blake, finance chairman for the National Board, attending the meeting.

Mrs. Rogers N. Herbert of Nashville, Tennessee, president of the Auxiliary to the American Medical Association, was the guest of Minnesota Auxiliary women January 26 and 27. She was on her way to Washington and the western states and was entertained at a State Board meeting in Saint Paul January 27, and also at a tea given in her honor by the Ramsey County Auxiliary.

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of December 11, 1935

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, December 11, 1935. The meeting was called to order at 8 o'clock by the President, Dr. A. R. Hall. There were forty-seven members present.

Minutes of the November meeting were read and approved.

The president appointed a necrology committee consisting of Drs. Balfour, Braasch and Walters, to write a memorial to Dr. E. S. Judd.

Upon ballot, the following officers were elected for 1936:

President—Dr. Thomas S. Roberts, Minneapolis.

Vice president—Dr. E. M. Jones, Saint Paul.

Secretary-Treasurer—Dr. R. T. LaVake (re-elected).

The scientific program followed.

practically never occur in cases in which there is skull fracture, but are found in the fatal cases of brain injury in which the cranial case is intact.

DR. GRANT (closing): In the past year there appeared an editorial in the *Journal of the American Medical Association*, which took up the question of visual field contractions following head injuries and the statement was made that moderate contractions of the field are always of pathologic nature. They believed also that marked concentric contractions were probably hysterical. This reference was from a German publication. The work of Klar on the diastolic pressure in the retinal vessels appeared at a later date. There is no unanimity of opinion of the cause of marked contractions of visual fields as to whether they are organic or psychogenic in origin, but the opinion up to the past few years was that they were hysterical. We are now beginning to believe that these visual field contractions do take place after trauma and are of organic origin. They can probably be differentiated by other symptoms, especially if vestibular and auditory are considered with them, as vestibular disturbance occurs in almost 100 per cent of the cases.

VISUAL FIELD CONTRACTIONS AFTER HEAD INJURY

HENDRIE W. GRANT, M.D.
Saint Paul

Dr. Grant read his inaugural thesis on the above subject and showed slides of visual fields in several cases.

Summary

Following head injury, contraction of the visual fields may be due to many causes. Some are purely neurologic, others appear psychic, and in still others both factors seem closely related. Contracted visual fields, simulating hysterical types in post-concussion syndromes, return to normal before cessation of other symptoms, and before settlement of the liability. They are explained as due to retinal congestion after vasomotor disturbance or to commotio retinae, causing physiologic block of the light impulse. Visual field studies and hearing tests with the audiometer are valuable adjuncts in the study of head trauma and the post-concussion syndrome.

Discussion

DR. W. E. CAMP (Minneapolis): I was very much interested to hear Dr. Grant's paper. There was one thing I would like to mention and that is where there is a moderate degree of contraction of the visual fields, may it not be due to spasm of the retinal vessels rather than to the commotio retinae?

DR. A. E. SMITH (Minneapolis): There is one thing which I think is important in differentiating the psychogenic cases from those due to trauma or organic disease, and that is that the people with hysterical field contractions almost always get around well in traffic, whereas the organic cases, in which the fields are correspondingly limited, do not.

I was interested in what Dr. Grant had to say about petechial hemorrhages through the cortex following an injury which did not have skull fracture. They

HEMORRHAGIC PURPURA

H. Z. GIFFIN, M.D.
Rochester, Minnesota

Abstract

My remarks are based chiefly on experience with sixty-two patients who underwent splenectomy for hemorrhagic purpura between March 7, 1923, and December 1, 1935.

Five of these patients died in the hospital. At first sight, this postoperative mortality seems rather high, but it should be stated that all of these patients who died were operated on during an acute phase of the disease. In three of these five cases the condition was chronic; in the other two it was incipient. In reviewing the histories, it is likely that two of the three patients in the acute phase of chronic hemorrhagic purpura would not now be submitted to splenectomy. These two patients were in extremis when admitted and they did not improve on medical treatment. They had cerebral symptoms and were operated on in an emergency in the hope of preventing massive cerebral hemorrhage.

In addition to these five patients who died in the hospital, four others have died subsequently. One of these four died of lobar pneumonia two years following operation. The other three had conditions related to the disease, one of them dying of cerebral hemorrhage less than one year following splenectomy, one of hepatic insufficiency with jaundice seven years following splenectomy, and the third apparently of uncontrollable uterine hemorrhage at puberty five years after splenectomy. It is likely that this last patient could have been saved had it been possible to send her to a medical center.

The remaining fifty-three patients are alive and are either in fairly good or excellent condition up to twelve years following splenectomy.

Classification of Cases.—The cases are grouped as follows:

Incipient of moderate severity.....	2
Incipient in acute phase.....	9
Chronic recurrent of moderate severity.....	39
Chronic recurrent in acute phase.....	12

This clinical grouping has been adopted in order to study more carefully the features of acute exacerbation, during which the operative mortality is high. Incipient cases are those in which patients are suffering from their first attack of hemorrhagic manifestations.

In general, a study of the cases from this standpoint indicates that patients with incipient cases of moderate severity can be operated on with very little risk, if the condition shows no tendency to spontaneous remission. Incipient cases in an acute phase have a high operative mortality, but if the patients survive operation, a satisfactory result is obtained. The most difficult group in which to make a decision with respect to splenectomy is that of chronic cases in a severe acute exacerbation. Patients with this type of the disease may be in extremis when seen, and, unless there is some response to transfusions, surgical treatment is likely to be of little avail; particularly is this true when cerebral symptoms are present, and I feel that patients of this type with cerebral symptoms should not be submitted to splenectomy.

Pre-operative and Postoperative Duration.—The pre-operative duration of the disease varied from several weeks to fifteen years; in most cases it was two years or less. The postoperative period of observation has been up to twelve years in two cases, and from eight to twelve years in nineteen other cases.

Age and Sex of Patients.—One patient was in the seventh decade of life. Nine were less than ten years of age. The largest number were between the ages of twenty and forty years. Forty-one patients were females, twenty-one males; in other words, 66.1 per cent were females.

Types of Bleeding.—As would be expected, the most common types of bleeding were from the nose and gums and into the skin. However, about half of the female patients had excessive uterine bleeding, and in a third of the cases there was gastrointestinal bleeding. In one out of ten cases bleeding was from the urinary tract.

Size of the Spleen.—A study of the size of the spleen, corrected for age and sex of the patient, revealed that nine of the spleens were normal, fourteen less than normal size. Only one spleen was exceedingly large. It is clearly not necessary to be able to demonstrate an enlarged spleen clinically in order to anticipate a satisfactory result from splenectomy. The smallest spleen weighed 30 grams, the patient being a girl six years of age; the largest spleen weighed 700 grams, the patient being ten years of age. The largest adult spleen weighed 550 grams.

Platelet Counts.—Preoperative platelet counts, made by the direct method using sodium citrate, averaged 75,000 per cubic millimeter. Platelet counts following splenectomy, up to twelve years afterward, averaged 193,000 per cubic millimeter. It is frequently stated that,

after the initial increase in platelets following splenectomy, the platelet count becomes reduced to its former level. In my experience this has occurred in only a small proportion of the cases. Usually the platelet level is considerably higher on multiple counts following splenectomy than preceding it.

Recurrences.—Recurrent bleeding has occurred in 35.4 per cent of the cases, and, for the most part, has been of mild degree. The highest percentage of recurrences has been among patients with chronic cases who were operated on in the acute phase of the disease. It has not infrequently been noted that mild recurrences have ceased and more severe recurrences have become less severe following the elimination of focal infection.

Conclusions.—Patients with a chronic form of hemorrhagic purpura of mild severity are best treated by elimination of focal infection, an adequate diet, the administration of iron, and, if necessary, transfusions.

Chronic hemorrhagic purpura of the disabling type is best treated by splenectomy during remission.

Patients with chronic hemorrhagic purpura seen during acute exacerbations should be treated medically and given an opportunity to improve, at least temporarily, before splenectomy is performed. If their response is unsatisfactory, splenectomy may be necessary even though the operative risk is increased.

Incipient hemorrhagic purpura of short duration and of mild or moderate severity should be treated medically.

Patients with the incipient form of the disease which progresses in spite of medical treatment should be submitted to splenectomy without much procrastination.

Discussion

DR. C. B. DRAKE, Saint Paul: I am prompted to mention very briefly a case of the opposite condition which I recently encountered; that is, one with a very high blood platelet count. The patient was admitted to Ancker Hospital early this year with a count of over 2 million platelets on repeated examination, and one time as high as 2,500,000. She came in because of extensive subcutaneous hemorrhages. Her red count was 4,500,000 and leukocytes 35,000. At first she had little to complain of except these large areas of subcutaneous hemorrhages. There were at first no abnormal white cells except a very occasional degenerated megakaryocyte. However, after several months she showed numerous immature white cells which placed her very definitely in the leukemia group. A very high blood platelet count, therefore, as well as a low platelet count may have hemorrhage as an outstanding symptom.

DR. M. H. HOFFMAN, Saint Paul: The particular type of thrombocytopenic purpuras which present the greatest problem to the physician are those who never had hemorrhages before and develop an acute attack. One wonders whether or not to advise splenectomy even though the medical treatment brings about a cessation of the bleeding. I recall one patient who apparently recovered pretty well from the acute attack, then later had reduction of the thrombocytes with a brain hemorrhage and promptly died. The other patient was a thrombocytopenic purpura case for at least a week before I saw him. He was not put to bed and one day, on his way home from a last visit to the doctor's office, he had a severe headache. They could not get his own doctor and called me. He died of brain hemorrhage. The question is, just when should these patients be operated on? Should a splenectomy be done after the first attack, even though the thrombocytes are re-

stored, to prevent accidents such as those just mentioned? I would also like to ask Dr. Giffin if he has had any experience with large doses of liver extract, fifteen to twenty times the amount given for pernicious anemia, and whether it has any effect on improving the number of thrombocytes.

DR. S. MARX WHITE, Minneapolis: One thing might be stressed in this connection, and that is the care with which the diagnosis of thrombocytopenic purpura should be made. I know that among practitioners of medicine as in this group there would be little likelihood for lack of care in developing diagnostic criteria for the diagnosis of the condition. At the same time we know that those studies are not always made. My reason for stressing care in diagnosis is that we are having in this part of the country now more cases of spotted fever of the infective type of the disease; not necessarily the fatal type as in the Bitter Root Valley, but the non-fatal types in which the fundamental condition is not a true thrombocytopenic purpura but an infectious disease with purpura. I think one should sound the warning that a case of purpura, simply because of purpuric manifestations, should not be put in this group and should not be operated on until a fundamental diagnosis is made.

DR. W. E. CAMP, Minneapolis: I would like to ask Dr. Giffin if any evaluation can be placed on the removal of foci of infection in the recovery of these cases?

DR. GIFFIN: The case Dr. Drake describes brings up a question with respect to the past history. Is it possible that this patient formerly had had polycythemia vera?

DR. DRAKE: My patient had been bled in November,

1934, at the out-patient department of the Ancker Hospital, presumably because of a suspected polycythemia, the reds at that time numbering 5,800,000 and the platelets over 1,000,000. She presented at that time an overproduction of red and white cells as well as platelets. The question arose, when I first saw the patient, of whether a diagnosis of thrombocythemia as an entity was justified. Later the blood picture became that of a myelogenous leukemia.

DR. GIFFIN: Cases of polycythemia vera almost always have high platelet counts and, for some reason or other, the high platelet count persists even though the patient later becomes somewhat anemic. Dr. Drake's statement that a study of blood smears reveals evidence of immaturity is also consistent with the diagnosis of polycythemia vera in its advanced stages.

The question of whether or not to recommend splenectomy in the acute phases of either a chronic recurring case or an incipient case, is very difficult to decide; in fact, it is almost an impossible decision to make. My experience has led me to endeavor first to carry the patient through the acute phase, hoping that a remission will occur, but, if a favorable response is not prompt, the patient is submitted to splenectomy.

In reply to Dr. Hoffman's question, the administration of very large doses of liver extract intramuscularly has been tried without specific effect.

The question of the importance of focal infection can be argued pro and con. Experience seems to indicate, however, that in a high percentage of cases post-operative recurrences have ceased after the elimination of focal infection.

The meeting adjourned.

R. T. LAVAKE, M.D., *Secretary*

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

PROCEEDINGS OF THE TWENTY-NINTH ANNUAL CONVENTION OF THE ASSOCIATION OF LIFE INSURANCE PRESIDENTS. 220 pages. 1935.

FOR AND AGAINST DOCTORS. By Robert Hutchison and G. M. Wauchope. 168 pages. Illus. Price, \$2.00, cloth. Baltimore: William Wood & Co., 1935.

GLANDULAR PHYSIOLOGY AND THERAPY. A symposium prepared under the auspices of the Council on Pharmacy and Chemistry of the American Medical Association. 528 pages. Illus. Price, flexible binding, \$2.50. Chicago: American Medical Association, 1935.

OBJECTIVE AND EXPERIMENTAL PSYCHIATRY. D. Ewen Cameron, 264 pages. Price, \$3.00. New York: The MacMillan Company, 1935.

Following the close of the World War, some psychiatrists, according to the author, found themselves in a sad dilemma. They sought more solid ground while facing the harder realities of active treatment. And "an increasing number of us experience a feeling of growing distrust of purely descriptive and intuitive concepts of human behavior and find it more and more difficult to content ourselves with facts or assertions save where they will withstand experimentation and will not fail us on prediction." A great de-

velopment of instrumentation and a larger understanding of experimental methods should in a fair way make possible an objective analysis of human behavior, and also enable us to predict and control such behavior.

In the first two chapters the author seeks to clarify the development and present position of experimentation and quantitation in psychiatry. Present methods of fact gathering have given rise to some assumptions which are criticised. Dogmatic statements of gifted leaders and knowledge gained from all too confusing observational methods are regarded as still playing too prominent a part.

In the following fourteen chapters as many topics, ranging from tests of intelligence to constitution, are discussed from the point of view of experimentation and quantitation indicated in many of the investigations that were reported in the literature mainly during the last decade and a half.

There then follows a chapter on pathology. Due to the tendency to favor study and attempted control of the organism in action rather than brain anatomy and pathology, pathology has declined somewhat and biochemistry and physiology have come more to the fore.

The final chapter of five pages is devoted to a discussion of the instruments of statistical methods.

It is a pleasant task to review this book. The subject matter represents wheat which is readily separated from the all too bulky chaff of pseudo-scientific literature produced unfortunately without adequate restraint.

JOSEPH C. MICHAEL, M.D.

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THE PATHOGENESIS OF GALLBLADDER DISEASE*

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THERE probably has been no part of the body which has received such neglect, as far as our ascertaining fundamental knowledge of its anatomy, physiology, chemistry and pathologic physiology is concerned, as the liver and bile tracts. In the last fifteen or eighteen years we have progressed a little bit, but our knowledge is still most woefully deficient.

There are today very fundamental things about the gallbladder and its physiology of which we are totally ignorant. For example, there are substances in the bile which occur in amount up to one-quarter of a per cent, of which we know nothing, and that is a very large percentage of unknown substances to find in any of the physiological fluids. We know pitifully little of the major constituents of the bile. Bile acids or bile salts, as they occur in the gallbladder, occur in concentration stronger than any substances occur in any body fluids. We don't know where they come from. It is only within the last few years that we have even known what they were chemically.

I think with this as an apology, we may present a brief review of some of the newer aspects of the pathological physiology of the gallbladder and bile tracts, and follow it up with what we may set tentatively as some of the facts which will be of aid in the clinical handling of gallbladder cases.

The first thing I want to speak of is a very simple and a very obvious one, and that is the size of the gallbladder. We see in our textbooks that the gallbladder holds an ounce to an ounce and a half. Most anatomists allow 30 to 40

c.c. content. We have seen, within a period of five years, statements by the greatest authorities on the subject that the gallbladder is too small to have any function. I believe most of us would now very definitely change our minds about the function of the gallbladder, and a great many of us would be prepared to admit that it has a function exceedingly important in digestion, and perhaps a function that we don't get along well without, when the gallbladder is removed.

It is very difficult to say how big a gallbladder is. The old statements from our anatomy books were taken from deadhouse material and operative specimens which, of course, have no live muscle in them and couldn't be stretched. However, if you go to the dog laboratory you will soon find that dogs' gallbladders, a great many of which are removed just to get dog bile, are actually larger in content than the anatomists allow for the human gallbladder.

We have tried to make some studies of the human gallbladder by x-ray, and, of course, the figures we arrived at are only tentative and only represent a minimum. If the gallbladder is placed at right angles to the x-ray plate, provided the gallbladder is full and hence rounded, one can calculate as to its size, but if the gallbladder is at a certain angle with the x-ray plate, it will appear to be a good deal smaller than it actually is.

A series of human x-ray studies show us that the human gallbladder, rather than 40 c.c. in size when full and round, runs up to 80 and averages nearly 60. When we consider that one of the functions of the human gallbladder as well as that of animals is not only to store the bile

*Read before the Minnesota State Medical Association, Minneapolis, June, 1935.

but concentrate it, and it concentrates it four to six times (some authorities state up to ten times, although I have never seen it as high as that), it is obvious that its functional capacity is 300 c.c., which is enough to take care of three square meals a day.

Some other facts about the physiology of the gallbladder that don't make us any happier as surgeons are that, through perfectly clear demonstrations, bile tracts as a whole do not dilate to any significant degree after cholecystectomy. At first we thought they did and hoped they did, but anyone who has done experimental work realizes that they do not. The reason we first thought they did was that the common ducts which had to be reoperated and were found enlarged were those that were obstructed, and I don't believe any observers today would admit that there is any very great enlargement of the gall duct as a storage space in the absence of the gallbladder.

The liver, unfortunately, is an obstinate organ that insists on secreting its bile independently of meals. That independence is almost absolute. There are variations in the rate of the secretion of the liver but it is not affected by meals. So we have to face the issue that when the gallbladder is removed we are removing an organ that is able to take care of most of the day's bile and pour it into the gut promptly when needed. Its use is the adaptation to the human preference for intermittent feeding. With the herbivorous animals feeding is constant—they have to eat all the time to get enough food—and they don't need gallbladders.

So much for the anatomy. Now for the chemistry of gallbladder disease.

Gallbladder disease is so tied up with the problem of gallstones that for the present I will not try to isolate the two. It is becoming more and more evident from the follow-up statistics of every clinic, including our own, that the removal of the non-gallstone-containing gallbladder is disastrous. The patients are very often no better, and we, therefore, are led to assume that their difficulty has been with the stones and not with the infection of the walls of the gallbladder. The older figures showed far more non-calculus cholecystitis than the recent figures do, indicating a recognition of this fact.

Gallstones are composed of three important

substances. The overwhelmingly important substance is cholesterol; next is calcium, and the next is pigment.

Cholesterol gallstones present a problem con-

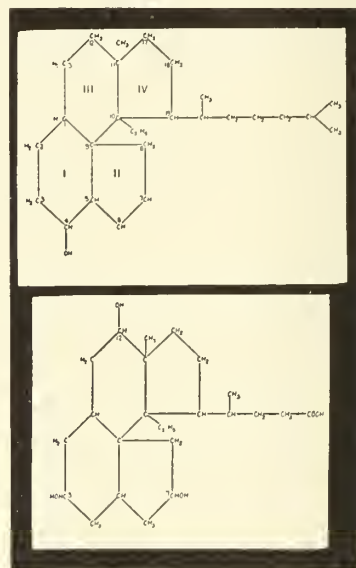


Fig. 1. Similarity of structural formulae of cholesterol (above), and a bile acid (below).

finely solely to man. There has never been any gallstone found, or made experimentally, to my knowledge, outside of man that contained any cholesterol. So we are dealing with a purely human problem in which experiments in animals have to be interpreted with very great caution.

Cholesterol has been associated so much with the bile that it has led us astray only too frequently. Far too often have we thought of cholesterol, until the modern blood studies of nephrosis, diabetes, and so forth, as a substance associated with the bile. As a matter of fact it is present in bile in rather low concentrations, only a small fraction of the blood concentration.

The cholesterol is almost certainly derived from or converted into some mechanism from bile acids. The accompanying formulas (Fig. 1) show the very great similarity between cholesterol and bile acids. It would be very difficult to tell these two apart without very careful study.

Cholesterol is not a bile substance nor a liver substance. Cholesterol is found in the blood, many times (even up to fifty times) its con-

centration in the bile. It is found in the bowel in very much higher concentrations than in the bile. The bile is not the main medium for the excretion of cholesterol, not the main route by which it is passed out of the body. The gut is the main route. That is the all-important thing we have to face in this gallstone problem, that it is not a diathesis.

Twenty to twenty-five years ago, there was a great furore when fairly accurate methods of making blood cholesterol estimations were discovered. It was found that some people had much higher amounts of cholesterol in the blood than others, and it was thought that these would be the people who would have gallstones. But today large series of observations have shown conclusively that the gallstone patient, in the absence of common duct obstruction, has no higher blood cholesterol than anybody else. It was a disappointment, and we had to start all over again.

We stubbed our toes before in another theory, which has recently been completely abandoned,—that there was secretion of cholesterol by the mucosa of the gallbladder.

In a series of experiments we found that the average cholesterol content of bile in the gallbladders of thirty-six dogs with stasis of twenty-four hours or less averaged 57 mg. per 100 c.c. of bile, whereas in forty-two dogs with common duct ligation of from three to fifty-eight days' duration the cholesterol was only 51 mg. per 100 c.c. These are by no means the only such recorded experiments and they all go to show that there is no more cholesterol in the static gallbladder than in the open one. Cholesterol is not excreted by the gallbladder mucosa and does not accumulate in the gallbladder under condition of stasis nor under conditions of inflammation, as will be shown later in this paper.

It has been shown by a large number of observers that cholesterol is carried over into the bile by the bile acids as a substance which has not been converted into the bile acids, as in most animals. Most animals have a much lower bile cholesterol than man has. The cholesterol is held in a chemical solution of bile salts, and this can be shown in a number of different ways. If you take human or dog bile you can dialyze the bile salts out, and after they are out so enough is not left to keep it discolored, there will be a precipi-

tation of cholesterol inside the membrane. The same experiment may be done just as easily with the gallbladder. The gallbladder makes a nice dialyzing membrane, and this whole phenomenon may be demonstrated with an actual gallbladder.

In the various types of gallbladder, the normal, the one with stones, acutely infected, or chronically infected, the cholesterol content stays about the same. There is very little change. I may say that the figures we present, and most people present, on cholesterols have a 20 per cent margin of error. There is no particular change in the amount of cholesterol in most types of gallbladder. In the infected, however, the bile salts are absorbed. We see a perfectly obvious explanation of why the cholesterol becomes precipitated in the closed or infected gallbladders when the bile salts are absorbed from them.

There is actually in our series, from operative specimens in the human being, hardly any more bile acid than there is cholesterol.

The other rather important substance in the human bile which gathers in the form of gallstones is calcium. Ordinary duct bile contains a calcium content rather similar to that of the blood, sometimes exactly the same, although at other times a little higher. I have never been able to demonstrate, as others have, the exact parallel between the two. It is concentrated in the gallbladder and it is concentrated about as many times as the other solids are. If the gallbladder becomes acutely infected, there will be a rapid absorption of this from the gallbladder material. If obstruction has been present for a while, infection goes away, things become more or less static and we have an excretion into the gallbladder interior of the bile from its wall. This produces calcium rings on stones made of cholesterol or pigment. It produces a deposition of the calcium and the spontaneous fractures which occur in cholesterol stones. It produces calcium cream which one finds sometimes in a gallbladder that has been closed for a long period, a milky substance which proves to be pure calcium carbonate milk.

Just to sum up here, I will review the action of the normal human gallbladder (Fig. 2). Here is what apparently happens. The normal human gallbladder simply absorbs water from the bile. It concentrates up to four to six times. As I say,

I have seldom found it concentrated more than six times, although some of the earlier observers report higher degrees of concentration. If you measure the pigment, calcium, bile salts and cho-

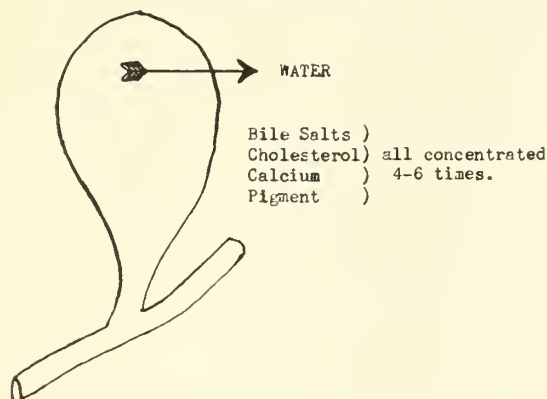


Fig. 2. Action of normal gallbladder.

lesterol, you will find they are all concentrated at about the same rate. Therefore, we assumed that during the normal period of concentration, which lasts a few hours during the day, not more than a day generally, there is no change in the bile except removal of water from it.

On the other hand, what happens when you get an acute infection? When you get an acute infection, the cystic duct is swollen shut, or perhaps it will be closed by a stone. We do have absorption of water, a rapid absorption of bile salts, and quite a rapid absorption of calcium (Fig. 3). The cholesterol and pigment stay untouched. That is the period of the first two or three days of acute inflammatory reaction or an edema.

Very soon the acute irritation subsides, but if the cystic duct stays blocked by a stone or any other mechanism we then have a huge secretion of calcium from the gallbladder mucosa (Fig. 4). I have produced experimentally such a secretion of calcium. The bile salts will be absorbed in the first few days. The cholesterol is absorbed very much more slowly. If the gallbladder stays closed, all the sterols may be absorbed within a few weeks' time, although it generally takes considerably longer than that. The pigment will be absorbed, but that generally takes a good many months. The pigment is probably absorbed in solution. I feel rather sure that the cholesterol is absorbed by the leukocytes or by wandering cells of some sort.

Taking that as the workings of the gallbladder then, there is just one thing left in gallstone formation, and that is the pigment. I believe the pigment may be a diathesis. The concentration

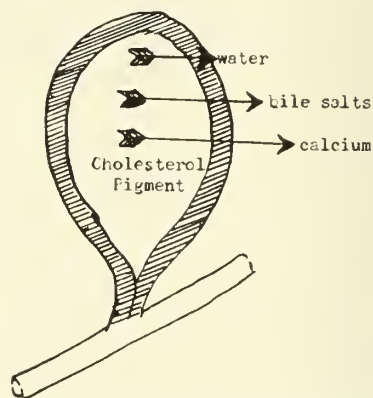


Fig. 3. Acutely obstructed gallbladder. The cystic duct is swollen shut or closed by stone.

of pigment in the gallbladder runs parallel with the pigment in the blood. There is the well-known hemolytic jaundice with the excessive pigment in the human being, where practically all get pigment stones if they live long enough.

There is the parallel of cattle, the ox that eats green food containing chlorophyll, which is an ancestor of bile pigment just the same as human blood pigment is. Oxen get gallstones. It also appears that pure pigment stones tend to be found in young people who are very dark and very hairy. So probably that is related as a metabolic phenomenon, and that actually there is a saturation of the bile in certain cases with pigment which brings about its precipitation. This is mixed with calcium carbonate. We speak of calcium pigment stones, and we used to speak of calcium bilihumin. The calcium bilirubinate in pigment stones is very little. It is really a mixture of calcium carbonate and pigment. So of the three, the cholesterol, the calcium and pigment, we only have the pigment which may be precipitated so we can see it in an open gallbladder.

The formation of cholesterol stones is in brief periods, with infection. Mixed calcium stones would require long periods of closure, with quiescence of infection or at least minimal infection.

That brings us to the old problem of the relation of cholecystitis to the gallstone. The commonest types of gallstone must, as far as we can

see physiologically and chemically, be produced in a closed gallbladder. What closes it? After there is once gallstone formation, it is obvious that a gallstone may close it, but what initiates

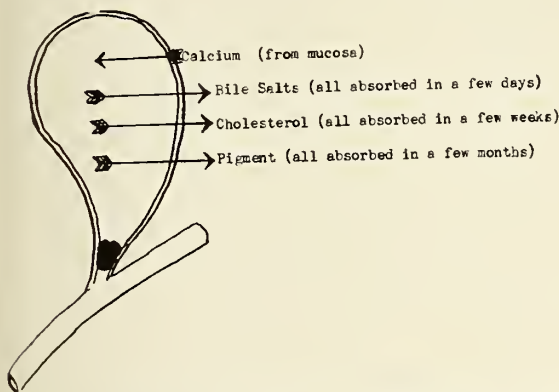


Fig. 4. Chronic cystic duct closure. Inflammatory swelling is subsiding or absent.

the first attack has always been a profound mystery and perhaps is even today.

With a view to trying to get an insight into this problem, we have been making some pathological studies. We have taken a series of about 120 cases in which we have removed many of the gallbladders without touching them with a clamp, except one on the fundus and one on the cystic duct. You cannot always do that, but sometimes you can. So we remove them intact. We have had chemical analysis and bacteriological studies on all those cases. We preserved the gallbladders carefully, injected them, and after they were set made serial sections about a centimeter apart.

The result of these studies has been in accord with the recent studies of Denton, Feinbatt and some of the comments of Boyd on the subject. There were things that surprised me, and I will give them to you as we found them.

The characteristic feature of acute or chronic cholecystitis is not a picture that is in any way consonant with that of an infection. The characteristic feature is, in the first place, edema, profound edema; enormous dilatation of the lymphatics; dilatation of the blood vessels; considerable hemorrhage in the acute cases; and a moderate degree of infiltration, not of pus cells but of large plasma-like cells and of lymphocytes. The polymorphonuclear leukocytes appear late in the subsiding stage when they are practically all eosinophils. The picture doesn't look like an ap-

pendix that is infected, nor a bladder that is infected.

Figure 5 is an example of a gallbladder. The mucosa is very little damaged. If we make our



Fig. 5. Note extensive damage to gallbladder wall with preservation of mucosa and that the main pathologic changes consist of edema in the outer coats. This example of acute cholecystitis yielded no bacteria on cultures.

sections carefully, inject the gallbladders without opening them and do it promptly, within an hour of the time of removal from the body, we find in most cases the mucosa intact and relatively normal. That is something Boyd has commented on also. He said it is astonishing how normal it may be.

The muscularis is but little thickened. The thickening in this case is in the serosa, as in most other cases.

TABLE I. MEASUREMENTS OF NORMAL AND "INFLAMED" GALLBLADDERS

	Thickness in millimeters		
	Mucosa	Muscularis	Serosa
Normal	3	1-2	2-5
Normal	3	1-2	2-5
Normal	3	1-2	2-5
Thickened	3-5	2-3	15-20
Thickened	3-5	2-3	15-20
Thickened	3-5	2-3	15-20

(From Andrews, Arch. Surg., Nov., 1935)

Some measurements of the gallbladder appear in Table I. The mucosa becomes but little affected, the muscularis little affected, but the serosa becomes several times its size.

PATHOGENESIS OF GALLBLADDER DISEASE—ANDREWS

TABLE II. CULTURES FROM GALLBLADDERS

	No.	Positive Per cent	Strept. Per cent	B. coli Per cent	Staph. Per cent	B. Welchii Per cent	Other bacteria Per cent
1932, Authors, Present series.							
Fluid contents.....	106	33	6.5	17.9	4.7		5.6
Wall.....	200	89	29.5	26	26	1	18
1928, Wilkie ³							
Fluid contents.....	50	12	4	6		2	
Wall.....	50	12	4	6		2	
1930, Gordon-Taylor and Whitby ⁵							
Fluid contents.....	50	32	8	12		6	6
Wall.....	50	82	22	18		16	26
1929, Branch ⁴							
Fluid contents.....	210	40	15	50	18	5	9
Wall.....	210	53	11	49	17	8	10
1928, Friesleben ⁶							
Fluid contents.....	132	47	11	28			8
Wall.....	96	76	13.5	28	32		2
1927, Illingworth ¹							
Fluid contents.....	100	40	17	21	3		
Wall.....	100	62	39	22			6
1927, Judd, Mentzer and Parkhill ¹¹							
Fluid contents.....	193	14.5	8	6	1	0.5	4
Wall.....	200	49	18	4.5	10	1	20
1916, Rosenow ⁷							
Fluid contents.....	29	55	17	31			24
Wall.....	32	84	56	28		22	22
1925, Johnson ⁸							
Fluid contents.....	100	32	3	18	7		4
1924, Blalock ⁹							
Fluid contents.....	270	58	5	31			10.7
1922, Drennan ¹⁰							
Fluid contents.....	100	19	2	12	4		1
Average of results:							
Fluid contents.....	1,340	34.7	8.7	21			
Wall.....	938	63.4	24	22.6			

(From Magner and Hutcheson, Jour. Can. Med. Assn., vol. 27, 1932)

Other factors of interest were those also found by the above observers, in that we couldn't find any empyema of the gallbladder. Case after case would come up, and when we would make smears of what we thought was pus, we would find it was calcium carbonate or crystals of cholesterol. In not a single case have I ever seen empyema of the gallbladder that would stand up under microscopic examination. I am sure it does occur, but all of them in our clinic have failed to stand up under microscopic examination. Search for bacteria in the walls of these gallbladders in our hands has been futile, and we found almost none in smears.

I would almost agree with the statement of Denton that the acute cholecystitis appears to him more comparable to a hemorrhagic infarct than it does to an acute infection.

We will go along to bacteriological studies.

Table II lists a large series of investigators who have made bacteriologic studies, and you will notice that in only about a half or two-thirds

TABLE III. PERCENTAGE OF CASES SHOWING INFECTION CLASSIFIED ACCORDING TO TYPE

	No. Cases	Wall	Fluid Contents	50,000+
Normal	8	37%	12%	0
Normal with stones	12	50%	33%	8%
Common duct	4	100%	100%	100%
Quiescent	36	33%	25%	8%
Active	31	42%	42%	6%

of the cases of acutely infected gallbladders has anybody been able to culture any bacteria.

Our own results were quite comparable. In the actual majority of cases we cannot culture bacteria. We have found about the same type of bacteria as others have. We, however, also made quantitative cultures (Table III). That is, we made plates and bacterial counts, as one would in milk. We were very much amazed to find that even the acute active gallbladders were in most cases (one-half) sterile, and in other cases they usually contained 25 or 30 bacteria per cubic

centimeter, or as high as 100. In only a small minority did they contain very large amounts.

So much for bacterial findings. We, nor anybody else, have not been able to culture sufficient amounts of bacteria from the overwhelming majority of our cholecystitis cases. One hesitates to accuse a whole generation of bacteriologists of incompetence, but in view of the chemical and pathological findings of ourselves and our colleagues and other observers, we have come to consider tentatively the matter of chemical cholecystitis. As you know, that has been produced in a number of different ways. It was produced by Mann through the injection of Dakin's solution intravenously. Wolfer injected pancreatic juice; gastric and intestinal juices were used in our own laboratory. There have been interesting reports from the Mayo Clinic on allergic cholecystitis. I couldn't at first see how it was a possible physiologic mechanism, but have been compelled to change my mind. However, there were other factors in it that we considered, and one was that we hadn't examined the bile itself carefully enough. It is quite generally accepted that gastric ulcer occurs because the stomach juices just get "too hot" for the bag that contains them. The acidity is too high, and it eats holes in it. There was a possibility that the same thing might occur in the gallbladder.

The difficulty of testing this was great, because if one sticks a needle into a gallbladder to inject anything, he will produce a marked cholecystitis at the point of the needle puncture. You can stick a needle into the skin or bladder or stomach without producing inflammation, but if you put it into the gallbladder you will have a spot as big as a dollar and the gallbladder will be five or six or ten times the normal thickness. If you put the needle in from the liver side, the same thing happens.

We have devised a simple trick for doing it. After extended experiments, we learned we could cut a hole in a dog's common duct, pass a ureteral catheter into the gallbladder, inject the substance, withdraw the catheter and put into the duct, a cannula to re-establish the flow of bile. By this technic, we found, we were able to get normal controls. We could inject material into that gallbladder and have normal controls. We tried rich emulsions, five and six to ten c.c. of streptococcus, staphylococcus, and other bacteria, and they, with the exception of one single strain

of streptococcus, hadn't the slightest effect on the gallbladder. They produced no cholecystitis whatsoever.

The next thing we tried was the use of bile itself in various concentrations, and much to our astonishment we found that by using bile, to which bile salts have been added in concentrations only one or two per cent more than the six or eight that are found in normal human bile, we produce an overwhelming cholecystitis, a thickened, white gallbladder, with fibrin all over it. A good many ruptured and leaked and gave rise to death from bile peritonitis.

I think it is at least significant that there is a possibility that the same mechanism, which we know may be working in the stomach, in that we have shown, in a series of 20 or 30 experiments now, bile salts at a concentration which is only a trifle more than that which the normal human gallbladder contains, will produce a most overwhelming cholecystitis. In view of the well known toxicity of bile salts, I think we may well suspect that some cases of human cholecystitis may be initiated by some such mechanism as this.

What lessons may we draw from this and other studies for the clinic?

In the first place, I would like to say a few words about silent gallstones. I think the operation on silent gallstones is a scandal.

TABLE IV. MORTALITY PER 100,000
(Decade 45-55)

Gallbladder	1,024
(about 30% have gallstones)	
Appendicitis	2,562
Breast	2,542
Uterus and Adnexa.....	4,455

If one takes the age decade of forty-five to fifty-five (about 30 per cent in this decade have gallstones), we find that the mortality from diseases of the gall tract is 1,024 per 100,000 (Table IV). This is a lower mortality than that from appendicitis or diseases of the breast, but nowhere near as high as from diseases of the uterus and adnexa. Modern x-ray technic enables the clinician to make the diagnosis of the presence of gallstones without difficulty, but in the case of silent gallstones I think it is a sin that any operations at all are performed in such cases.

There are other very important lessons to be drawn. Our follow-up statistics have shown us

that there are two definite types of syndromes which have been attributed to the gallbladder.

The first is that of biliary colic, and our follow-ups have shown that our results in the curing of biliary colic have been first class. They are far better than from intestinal surgery, and the percentage of complete cures is surprisingly high.

On the other hand, there is a larger group of cases that used to be considered gallstones. They are cases that really have gallstones all right. That is simple enough to prove with an x-ray. On the other hand, they are cases which do not present the syndrome of an acute biliary colic but one that vaguely resembles a gastric syndrome, with belching and gas, irregularity of bowel movements, colic of a mild sort definitely in the colon, not in the gallbladder, and cramps. All we can say is that it is a vague indigestion that doesn't quite fit the ulcer syndrome.

I don't know how many gallbladders have been removed for this syndrome, but I know in Graham's and Palmer's series, and our own, the results from surgery have been disastrous. Only a small minority of our patients have been cured of this syndrome by removal of the gallbladder. Most of them stayed as they were. About a third of them were improved, but most of them stayed as they were; they persisted in having this same syndrome just as they did before operation. Also, on study we found that a good many of our patients who had had gallbladder colic previously, had had no indigestion, and when we removed their gallbladders they developed such a syndrome.

This may be due to one of two things. I think it is definitely associated with the fact that these patients' gallbladders are out of commission. As I tried to demonstrate, the gallbladder has a definite function. If the cystic duct is closed or the gallbladder is so packed with stones it can't empty, it can't perform this function. I feel firmly that the vague indigestion syndrome is not due to irritation from the gallbladder, but the absence of the normal function of the gallbladder. Hoping to restore normal function by removing the gallbladder is absolutely idle. It may be that either these patients without gallbladders or with functionless gallbladders are pouring bile into an empty gut, or, that they are not pouring bile into a full gut and helping it to digest. Which of these mechanisms is the true

one, I would hesitate to guess, but I feel confident it is one of these two.

Furthermore, we studied a series of cases of cholecystitis that had had acute colics, and they had had no indigestion between times. Of this series, we picked out about twenty that promptly developed this mild indigestion, and we found those twenty had had active gallbladders. In other words, we may very well initiate this form of indigestion by the removal of a gallbladder which has only given symptoms of colic before.

There are some other lessons we may draw from this, and the next thing we will come to is the question of operation for acute cholecystitis. There has been considerable literature lately emphasizing the safety of the operation for acute cholecystitis. I have done a number of such operations myself in the last few years, and I doubt very much if I will do very many more of them. I feel what they say about the safety of operating at this stage is true. You are not always going to get overwhelming infections, because it has been shown that bacteria do not play an important part in the majority of cases.

It may be easy, however, for the patient to get his gallbladder out in a hurry, but it is pretty tough on the surgeon, and if we operate frequently in the presence of acute cholecystitis we are going to make a lot of technical errors, because the operation is much more difficult technically. Furthermore, all cases of cholecystitis have a low bacterial count. There are some that are very definitely infected, and I suppose one might operate on fifty or 100 cases of acute cholecystitis, most of which are not infected at all. They consist of either a chemical or mechanical irritation, but when we operate on the fiftieth or hundredth really infected one, we are going to get the flare-up which made surgeons twenty-five years ago stop operating on acute gallbladders.

It used to be that an empyema would frighten a surgeon and he would think he had better drain it, because if he removed it, he might stir up an infection. I checked up on those we removed and found they had less than the average postoperative complications. Most of them aren't empyemas. We are frightened by the appearance of something that looks like pus, when it isn't pus at all.

The next thing we will speak of is the so-called Graham's minimal lesion of the gallbladder. These gallbladders often have a cholesterosis. I

do not believe that is a disease. It is normal in many animals. Whether it is normal in man or not, I don't know. However, our studies of gallbladders which did have cholesterosis made me believe it is more common in a normal gallbladder than in a diseased gallbladder. I do not believe it is a cause of gallbladder disease, but simply a condition that has no pathological significance. It is normal in several of the laboratory animals.

Let us now consider the matter of fever. If one accepts what we have said here, the nature of the pathological picture, the lack of ability to cultivate bacteria, we seem to take away the cause of fever in cholecystitis. Case after case has a high fever and neither we nor anybody else have been able to grow bacteria from more than half of such gallbladders, and then only in small numbers. I suspect we will have to reconsider our ideas of the cause of the fever.

Years and years ago we learned of Charcot's intermittent fever. We learned that the common duct obstruction was prone to cause fever. Every one we cultured showed 50,000 plus bacteria per cubic centimeter.

There were twenty-eight patients with cholecystitis in our series who had high fever, but the average acute gallbladder attack is not necessarily characterized by a high fever, as has been shown in the Mayo Clinic and a number of other places. It is very common to have a leukopenia with it.

I selected a number of patients who had fairly high fever. Of those, eleven were grossly jaundiced. Eight had a high van den Bergh index. One had a single white stool before operation. Three had stones, and four had obstruction at the juncture of the common and cystic ducts. Jaundice is usually caused by gallbladder disease and not by common duct disease. In the cases of jaundice one sees in the clinic, the overwhelming number are due to a stone or some inflammatory mass at the angle where the cystic duct joins the common duct. In some, the common duct is partially closed, just enough to cause a little tinge of jaundice but not enough to cause white stools.

Seeing that in this series we were able to account on the basis of common duct obstruction for twenty-seven out of twenty-eight, we have come at once to suspect the common duct in cases

of sepsis just as much today as we do on account of jaundice. Because the overwhelming percentage of cases of gallbladder disease have some tinge of jaundice, and such a few of them have common duct stones, I think these findings have a little bit to do in pointing to how often we should explore the common duct.

I think there has been much too much exploration of the common duct by actually opening it. I don't think there is any doubt that gallbladder mortality is going to be very markedly raised if we probe too many common ducts. Today, I limit common duct probing to cases in which there has been sepsis, and cases in which I have pretty definite proof that there is a common duct stone. In other cases, I have given up probing the duct, and I think the corresponding drop in mortality has been very gratifying. If we start probing ducts in every gallbladder case that has or has had a little jaundice, we are going to cause a lot of trouble.

To go on with the matter of jaundice, the preparation of the jaundice patient, I believe, is very important, and, to me, is one of the great mysteries of gallbladder trouble. The preparation of a jaundice patient consists of administering large amounts of glucose first. If you have lots of time and the patient isn't too sick, this should be a dietary measure. If he can't take all the food or perhaps can't eat at all, it should be done by the intravenous route. The well known protective effect of glucose on the damaged liver need not be discussed here.

The problem of calcium is a very interesting one. A few years ago there was a long series of articles showing how the administration of calcium in huge amounts pre-operatively would save many of our jaundice patients from hemorrhagic diathesis. On the other hand, the addition of calcium to the blood of the patient will not make the clot. But we have behind us today a good many years of clinical experience with the use of this, and in my hands and the hands of others it has been successful. So, in spite of the fact that we don't know why we give them calcium any longer, I think we should continue to do so, because, in my experience, it has more than justified itself. The bleeding that occurs in these jaundice cases is a bizarre performance. They often don't bleed at the operation more than the next patient will, but when the fatal times does come it is likely to occur from muco-

sal surfaces and not wound surfaces. The bleeding may occur into the lumen of the gallbladder that you put a drain into. It occurs very suddenly. I know of no special reason to explain this. In my hands, the coagulation test, bleeding test, and all, have been perfectly futile. They have not enabled us to predict the patients who are going to bleed. In other words, we have had patients with profuse hemorrhages from the mucous surfaces, from the bowel and mouth, who before operation had normal coagulation and bleeding times. I have lost all confidence in any test that predicts which case will or will not bleed, except that I feel very sure the more recent introduction of huge amounts of glucose as preoperative and postoperative measures has done more to prevent the bleeding than the calcium or anything else we have given the patients. I don't know why, and I have no answer to give to it.

We often encounter jaundice which is obviously incurable, due to carcinoma. We predict we are going to find this according to Courvoisier's law. In Sir William Osler's time, he noted that Courvoisier's law wasn't enforced, and instead of being 100 per cent it went to 40-60. I don't think it is of any value as a prognostication of what you will find in an abdomen. It hasn't helped me in the least. With 40 per cent one way and 60 per cent the other, there is just about as much chance of finding a large gallbladder as a small one.

I feel very sure that all cases, even of silent jaundice, should be explored. I know of no operation that gives a more dramatic palliation than a bile short-circuiting operation, either implanting the gallbladder into the stomach or duodenum. Besides the chances of palliation, there are a large number of cases of silent jaundice which we cannot diagnose which turn out to be simple common duct stones that are easily operable. We have made it a point to explore all cases of even silent jaundice, and I think it is quite thoroughly justified.

However, if you cannot make a short-circuiting operation due to the extent of the cancer or due to the shrinkage or partial obstruction of the gallbladder, there is something you must not do, and that is to drain the gallbladder. There is a persistent tendency on the part of the medical man to demand that you "drain the poison away." I don't know what right anybody has to

call a body fluid a poison. Bile is a vital necessity to life. The longest survival of an experimental dog with biliary fistula was five and one-half months. The longest survival I know of in an adult experimental animal with jaundice was sixteen months. In other words, biliary fistula is about three times as dangerous as jaundice is. The drainage externally of bile, following carcinoma of the pancreas, in order to "remove poison" so far fails, that the average length of life of the patient, in the series I have been able to get hold of, is under one month. They may be expected to fade out exceedingly rapidly where you drain the bile externally.

One more technical point with the common duct operation. The common duct is exposed in the peritoneal cavity in such a way that it cannot be closed, even a duct which is dilated to the size of one's thumb, or even larger. It may be my lack of technical skill, but in the majority of cases I have been totally unable to make a waterproof closure of one of these enormously dilated common ducts after removing the stones. In other words, sooner or later, and often distressingly sooner, the bile begins to leak around the tube into the peritoneal cavity. Such cases have profound sudden reactions, for two reasons, and there is one thing that is a life-saving measure. They have these reactions because this common duct bile is often infected and contains a lot of bacteria, very much more so than gallbladder bile in acute gallbladder disease. As I said before, the common duct bile may contain an enormous number of bacteria in the presence of obstruction, whereas normal common duct bile contains nothing. Therefore, you think that, as a life-saving measure in these common duct cases, you should wash out and aspirate as much of the common duct system as you can. If the bile is there and stagnant, we make an effort to aspirate that and get it outside the body.

In the second place, bile peritonitis, which is the real danger in a good many of these cases, is caused by the bile salts. After operation, especially after one with ether anesthesia, there is marked damage to the liver, and it no longer secretes bile salts in concentration sufficient to cause an irritation of the peritoneum. In the few days that it is necessary for the liver to sufficiently recover to secrete strong, concentrated bile again which is productive of peritonitis, the process will have become walled off.

Dr. Hawkins, in our laboratory, has just been making some very interesting experiments with this sort of peritonitis. He has shown that the peritonitis caused by bile salts or that caused by liver autolysis produces an exudate in the peritoneal cavity that runs rather similar to blood plasma of sufficient magnitude that if one calculates how much loss of blood that much exudate would represent, it would account for all the symptoms. The blood pressure falls rapidly with oncoming death. In other words, the hypertonic bile that comes into the peritoneum draws fluid and protein out of the blood. The exudate in such a peritoneum is often not toxic. One may put a pint of it back in the dog and it won't kill him. It may actually raise his blood pressure.

One must realize in these cases, and we have confirmed it with a few clinical studies, the great importance of keeping up the blood volume and the blood proteins. In other words, what these patients need, especially if we are going to submit them to a lot of strongly hypertonic bile over peritoneal surfaces (and we have to predict that we are going to have exudation), is a transfusion, and one should have a donor typed and be

prepared to give a blood transfusion to make up for the loss of that blood plasma.

I want to mention the relation of bacteria to some of these processes which occur in the peritoneum following leakage. Bile peritonitis, in most of the clinically reported cases, has not usually occurred after biliary tract operations. It has occurred in the presence of a normal gallbladder, and we don't know how, in the majority of cases, the bile reached the peritoneum. We have found that this bile peritonitis is accompanied by the growth of a large number of organisms, including Welch's bacillus in an exceedingly avirulent form. We do not believe this peritonitis is in any way especially related to Welch's bacillus, because we can inject that same organism from a human being or animal into the next one in overwhelming amounts, and there will be no peritonitis produced.

I think that as our studies go along we tend more and more to minimize the importance of bacteria and to emphasize chemical factors which fit in better with lack of bacterial findings. They fit in better with the pathological picture, and I think we shall be surely able to fit into that picture the clinical findings of the patient himself.

CHRONIC DUODENAL STASIS: A REPORT OF EIGHT CASES

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Etiology

CHRONIC compression of the third portion of the duodenum, according to Duval,¹³ was first described in 1900 by Petit of Paris in his thesis. He found this condition present in a cadaver, made excellent drawings of the appearance of the duodenum, and finally devised and executed a duodeno-jejunostomy on the cadaver. Duval found that in many cadavers there has been a flattening of the duodenum, as it crosses the spine, by the root of the mesentery and its vessels, and occasionally he even found a definite groove made in the duodenum, without dilatation above this point. He concluded, therefore, that stenosis of the duodenum here is only an accentuation of a normal condition. He shows plates to demonstrate that either the superior mesen-

teric artery or its first branch, the colica media, may be responsible for duodenal obstruction, the latter being the responsible factor when the ascending colon and cecum are redundant and the hepatic flexure of the colon occupies a low position in the abdomen. Other influences favoring this compression of the transverse portion of the duodenum are, according to Bloodgood⁵ and Duval,¹³ an abnormally short mesentery or relaxation of the abdominal wall, which favors a drag on the root of the mesentery. Laffer²³ called attention to loss of fat from around the mesentery as favoring a dragging on the mesenteric root. Codman⁷ thought man became subject to this affliction on assuming the erect position, for in animals on four legs the root of the mesentery hangs at a right angle from the du-

odenum and spine. Connor,⁸ in experiments on cadavers, found that a 500 gram pull exerted on the mesentery by a cord passed out through the anus, was sufficient to effectively constrict the lumen of the transverse portion of the duodenum. Dragstedt¹² has found that in dogs as little as six inches of water pressure applied to this portion of the duodenum is sufficient to cause the death of the animal by duodenal obstruction. Several authors, Laffer,²³ Pool,²⁶ and Duval,¹³ stress the importance of faulty innervation of the duodenum in favoring duodenal stasis. Duval had never seen a case of megaduodenum but believed that those which have been reported were related in their etiology to Hirschsprung's disease of the colon. Pool cites many cases where the onset of symptoms followed severe infections, fatigue and emotional upsets. He believes there are often spastic contractions at different levels of the duodenum, and sometimes atonic flaccidity of its wall. These may represent forms of vagotonia or sympatheticotonia respectively. Pool further believes that some people have a moderate degree of duodenal obstruction by the mesenteric root but have no symptoms until the duodenum periodically loses its tone (as with infections, emotional strain, fatigue, etc.). Normally the duodenum can compensate for slight obstruction. This periodicity of clinical symptoms has also been very characteristic in the series of cases here reported.

Various other anatomical causes for duodenal stasis have been described by many authors. Among these may be mentioned (1) congenital stricture of the duodeno-jejunal angle (Carling,⁶ Spriggs,²⁹ McDonald²⁴); (2) angioma of the duodeno-jejunal angle (Beer³); (3) embryological remnants of the gastro-hepatic omentum; developmental bands of adhesions from the transverse colon to the gallbladder, liver or pylorus; diverticula of the duodenum; cysts, hematoma, carcinoma or interstitial change at the head of the pancreas (Crouse⁹); (4) a mass of tuberculous mesenteric glands obstructing the terminal duodenum (Downes¹¹); (5) an intraperitoneal duodenum with the omentum and ascending mesocolon adherent to the duodenum causing constriction (Bargen and Walters¹); (6) a wide band of mesentery constricting the duodeno-jejunal angle (Judd and White²⁰); (7)

kinking at the duodeno-jejunal angle by overactivity of the muscle fibres in the ligament of Treitz (theoretical possibility).

Symptoms

Many excellent articles describing the clinical picture of duodenal stasis have appeared in recent years, among which are those of Kellogg,^{21,22} Duval,¹³ Pool,²⁶ DeBeule,¹⁰ Downes,¹¹ Quain,²⁷ Wilkie,³⁴ Tinkham,³³ McKenty,²⁵ Graham and Platou,¹⁵ Halpert,¹⁶ Higgins,¹⁸ Summers,³² Judd and White,²⁰ Fulcher (discussed by Balfour¹⁴), Shattuck and Imboden,²⁸ Hartsock,¹⁷ and Jewett.¹⁹

The symptoms which may be found in a moderately advanced case are the following: epigastric fullness and crampy pain in the epigastrium occurring immediately after meals in some cases, and in one to three hours after meals in others; nausea and moderate vomiting; bilious attacks with migraine headaches; weakness; anorexia; acne; weight loss approaching emaciation in many patients; constipation usually, but Duval has described several instances of "duodenal diarrhea" which may be due to forceful shooting of the duodenal contents past the obstructing point or to an increased "gradient" in both directions from the writhing duodenum or possibly due to mild pancreatitis. Vomiting and diarrhea may be seen in the same individual. Crile,* Hartsock¹⁷ and a few others are so impressed with the relationship of migraine to duodenal stasis that they fluoroscope all migraine patients to rule out this condition. Remarkable relief has followed duodeno-jejunostomy, they say. Pool²⁶ emphasizes the fact that these patients invariably develop instability of the sympathetic nervous system and if unrelieved always become psychoneurotic. He thinks the duodenal stasis is primary,—not the reverse. The common symptoms are fatigability, headache, nervousness, palpitation, weakness, insomnia, anxiety, and occasionally fixed ideas of inadequacy with depression. "These psychoneurotic trends," he says, "seem to us more constant and more profound than in any other disorder of the digestive tract." If the pylorus is incompetent marked dilatation of the stomach occurs and the patient may have projectile vomiting of tremendous amounts of fluid digestive

*Discussion of paper by Pool et al.

juices, often as much as a gallon. Physical signs which may be found are distention of the right half of the epigastrium with a succession splash heard on palpating the duodenum or stomach. Many patients have discovered that relief from pain may be had by assuming the ventral, right lateral, or knee-chest positions. A complicating hemorrhagic pancreatitis or cholangitis sometimes develops due to regurgitation of duodenal fluids into the bile or pancreatic ducts. Peptic ulcer is rarely found in these patients.

Diagnosis

The age group most subject to duodenal stasis is from twenty to thirty years of age, though cases have been described from three to sixty-five years of age. The ratio of women to men usually is given as three to one.

Besides the history and physical examination, the diagnosis depends chiefly on careful fluoroscopy of the duodenum and stomach. Formerly the giant duodenum was the only type of duodenal stasis found, but in recent years, due to more frequent and more careful fluoroscopy of the duodenum, mild and moderate cases have been noted and described very frequently. I should like to emphasize here, what Kellogg,^{21,22} Pool,²⁶ Jewett¹⁹ and others have stated, that the evidence often is obtained only with fluoroscopy and that films may show nothing. In the series here reported this was decidedly true. In only one of this group were the films of any diagnostic value. Kellogg²² classified four stages of duodenal insufficiency: (a) asthenic duodenum; (b) duodenal obstruction with an incompetent pylorus; (c) duodenal obstruction with hypertrophy ("writhing duodenum"); (d) dilated duodenum. Jewett¹⁹ in an excellent article, described the fluoroscopic appearances of the duodenum as follows: dilatation of the duodenum with writhing and frequent waves of reverse peristalsis; puddling of barium in the lower loop of the duodenum; tenderness over this same area; often a six-hour retention of barium in the duodenum. The superior angle of the duodenum is seen to be high in relation to the greater curvature of the stomach. In milder cases, Duval¹³ describes only a prolonged fullness of the duodenum lasting longer than the usual six to eight seconds which barium spends

in the cap or the eight to ten seconds it normally spends in the entire duodenum. During fluoroscopy, pressure applied on the lower abdomen, upward and to the left may allow the duodenum to empty by relaxing the mesenteric obstruction of the duodenum, or having the patient lie on his abdomen may allow duodenal emptying.

Treatment

All authorities on this subject agree that not all patients suffering from duodenal stasis need be operated, and urge a preliminary trial of medical measures. These measures include the following: frequent small feedings; a weight-gaining high calorie bland diet; sedatives; antispasmodics, particularly atropine or belladonna; support of the lower abdomen by a proper corset or belt; use of the right lateral or knee-chest position frequently, especially to relieve pain. Gastric lavage may be needed toward the end of the day. Hot abdominal packs, occupational therapy, and exercises in bed to strengthen the abdominal muscles are all recommended.

Surgical treatment has varied, in the past, including severing of constricting bands or adhesions, high fixation of the hepatic flexure of the colon to the anterior abdominal wall; gastro-enterostomy; duodeno-jejunostomy. The last named operation is now universally recommended as the logical drainage for an obstructed duodenum. It was first suggested in 1900 by Petit* in France, and by Barker² in 1906 and later Bloodgood⁴ in 1907 in this country. The credit for performing the first duodeno-jejunostomy is given to Stavely^{30,31} in 1908. The loop of jejunum as it descends from the duodeno-jejunal angle is anastomosed, by a lateral anastomosis, to the dependent or third portion of the duodenum after the peritoneal covering of the latter has been opened. Further technical surgical details will not be discussed here, but are excellently described by Duval,¹³ Pool,²⁶ and Kellogg.^{21,22} Recent writers all condemn the use of gastro-enterostomy for treatment of duodenal stasis. The patients do surprisingly well post-operatively, for one of the chief causes of post-operative vomiting has been relieved. The operative mortality is less than one per cent in most series.

*Quoted by Duval.

Results

Many of the more recent writers have reported large series of duodeno-jejunostomies, with very satisfactory follow-up results. Kellogg²² reported forty-one cases, with complete relief of symptoms in thirty-six and improvement in four. Wilkie³⁴ of Edinburgh had a series of sixty-four duodeno-jejunostomies with three operative deaths in emaciated patients. A follow-up on fifty-seven of these after from one to five years showed twenty-three cures, eleven good results, twelve fair results and nine failures. He said that none of the failures were made worse by the operation. DeBeule¹⁹ in 1931 reported eighty cases with excellent late results and one operative death. Duval¹³ had operated fourteen cases in 1928, with excellent postoperative results. Pool²⁶ reported eleven cases operated by himself; of these there were seven excellent results, two fair and two doubtful results. Crile* in 1933 had done twenty-one, fourteen of which he could trace; ten were improved and four were unimproved. Pool²⁶ emphasizes the fact that the findings at operation are often not conclusive, as the duodenum may be collapsed at the time. A brief summary is here included of eight patients operated by duodeno-jejunostomy, by Drs. A. R. Colvin, Robert Earl and George Earl of Saint Paul. All of these patients had been given an adequate trial on a careful medical regime for duodenal stasis. None of these patients had a giant duodenum but all could be classed as having a moderate degree of duodenal stasis on fluoroscopy, and clinically the stasis varied from moderate to severe.

Case 1.—White, male, thirty-four years of age, a street car conductor.

Symptoms were crampy pain in the lower epigastrium with a burning sensation at the navel immediately after meals or three hours after meals. No relief on spastic bowel therapy, even with bed rest. *X-ray* examination in December, 1930, and February, 1931, showed a very large duodenal cap and moderate associated enlargement of the rest of the duodenum with writhing and active antiperistalsis. *Duodeno-jejunostomy* was performed on March 2, 1931, by Dr. George Earl. Arterio-mesenteric obstruction was found. Also the pancreas partially surrounded the second portion of the duodenum. *Fluoroscopy* done six weeks and again seventeen months later showed a completely normal duodenum, barium passing out of the new stoma. No

stasis was present. *Check-up* on April 8, 1935, revealed a complete cure with a gain of ten pounds in weight. *Result:* "Cure."

Case 2.—White, female, twenty-four years of age, a nurse.

Symptoms were nausea and vomiting constantly for six months and periodically prior to that. Loss of thirty pounds in the past two months. There was a constant dull pain in the epigastrium which became crampy immediately after meals. Vomiting occurred in five to thirty minutes after meals and relieved the pain. Appendectomy had been done in 1925. *Fluoroscopy* on December 31, 1932, showed puddling in the second and third portions of the duodenum with definite dilatation and rather active antiperistalsis. *Duodeno-jejunostomy* was done on January 18, 1933, by Dr. A. R. Colvin. Convalescence was rather slow. *Fluoroscopy* on March 25, 1933, showed the new stoma functioning freely and a normal size of the duodenum. *Check-up on March 10, 1935:* The patient eats three "square meals" a day. No symptoms. Weight 112 pounds (a gain from 89 pounds before operation). *Result:* "Cure."

Case 3.—White, female, twenty-three years of age, a stenographer.

Symptoms were periodic attacks of severe nausea and vomiting of liquids and all foods intermittently for one and one-half years. Loss of twenty-seven pounds in weight. Appendectomy and later cholecystectomy had been done elsewhere for the same complaints. The patient gained twenty pounds on a medical regime but attacks persisted. *Fluoroscopy* on June 11, 1933, showed puddling and reverse peristalsis in the second and third portions of the duodenum. *Duodeno-jejunostomy* was done on September 12, 1933, by Dr. George Earl. *Fluoroscopy* on December 14, 1933, revealed the new stoma functioning freely and a normal calibre of the duodenum. *Check-up on March 5, 1935:* Patient weighed 140 pounds (gain of 40 pounds). No symptoms. *Result:* "Cure."

Case 4.—White, female, twenty-four years of age, a telephone operator.

Symptoms: Nervousness for a year and a half; vomiting periodically for three months; attacks of nausea intermittently for a year and a half. Weight loss of twenty-one pounds in three months (120 to 99). *Fluoroscopy* done at two occasions showed puddling in the dependent portion of the duodenum, with antiperistalsis. *Duodeno-jejunostomy* was done August 18, 1933, by Dr. Robert Earl. Appendectomy also was done because of chronic changes in this structure. *Fluoroscopy* on March 22, 1935, revealed the new stoma functioning well with only a momentary delay of barium at the stoma. Active reverse peristalsis was seen. *Check-up on March 11, 1935:* Patient weighs 109 pounds. She rarely vomits now but when very nervous has epigastric cramps for four to seven days at a time. Her strength is poor. *Result:* "Fair."

Case 5.—White, male, twenty-seven years of age, a bank clerk.

Symptoms included a burning sensation just above

*Discussion of paper by Pool et al.

the navel fifteen to twenty minutes after meals, relieved by lying down. The patient had been under heavy nervous tension for over a year. *Fluoroscopy* showed slight dilatation of the second and third portions of the duodenum with active writhing and antiperistalsis and definite puddling in the dependent portion. *Appendectomy* was done on August 5, 1933, by Dr. George Earl. No relief of symptoms occurred. *Fluoroscopy* and reray one month later showed more severe duodenal stasis. *Duodeno-jejunostomy* was done on September 12, 1933, by Dr. George Earl. *Fluoroscopy* on June 18, 1934, revealed a large cap still present. No stasis. The stoma was functioning freely. No antiperistalsis was seen. *Check-up on June 25, 1934*: Cramps with heaviness at the navel were occasionally noted. Patient admitted no relief. Temporary relief only was had on an allergic elimination diet. In June, 1935, the patient admitted that he felt much improved and the fluoroscopy revealed again a very excellent physiological result. *Result*: "Good."

Case 6.—White, female, forty years of age, a beauty parlor operator.

Symptoms: Diarrhea intermittently for four months. Vomiting intermittently for ten months; weight loss from 200 to 118 in ten months; severe intermittent epigastric crampy pains occurring one to two hours after meals, lasting until she vomited. Had had appendectomy and cholecystectomy nine months previously. Adhesions with obstruction were operated soon after the first operation. *Fluoroscopy* showed 50 per cent gastric retention of the six hour barium meal. Puddling and dilatation (moderate) of the dependent duodenum but no antiperistalsis were noted. *Fluoroscopy* done three months later revealed 75 per cent gastric retention and active antiperistalsis carrying the barium into the stomach from the duodenum. *Duodeno-jejunostomy* was done on April 16, 1934, by Dr. Robert Earl. Many adhesions were found all through the area of the previous operation. The second and third portions of the duodenum were found dilated and in low position. The mesenteric vessels caused a tight obstruction across the duodenum. *Course*: The patient was moderately improved but diarrhea occurred frequently. Profuse bleeding of early menopause was present. A small ovarian cyst also was present. X-ray treatments were given to stop the bleeding. *Fluoroscopy* done on June 18, 1934, revealed a large duodenal cap with no deformity. No stasis was seen. Prompt emptying through the stoma occurred. *Check-up on April 12, 1935*: She has some arthritis but otherwise is much improved. An abscessed tooth was found and removed. *Result*: "Fair."

Case 7.—White, female, thirty years of age, a school teacher.

Appendectomy had been done sixteen years ago. Adhesions were operated three years ago and a subtotal thyroidectomy had been done in 1928. *Symptoms*: Spastic constipation for many years with pain in the right lower quadrant for many years; upper abdominal bloating and distress after eating. *Fluoroscopy* showed definite puddling of barium in the dependent portion

of the duodenum and some antiperistalsis. There was proximal colon stasis at fifty-six hours. *Duodeno-jejunostomy* and resection of the cecum and ascending colon were done on April 3, 1934, by Dr. George Earl. Marked arteriomesenteric compression of the duodenum was found. The cecum and ascending colon were involved in a mass of adhesions. The ileum and transverse colon were joined by a lateral anastomosis. *Fluoroscopy* on December 26, 1934, showed the stoma to be functioning freely. No barium went around the duodeno-jejunal angle. No ileus was seen. *Check-up in February, 1935*: The patient says she never felt better in her life. Her only complaint was mild diarrhea (due to absence of ascending colon, in all probability). *Result*: Probably "good."

Case 8.—White, female, twenty-seven years of age, an office clerk.

Symptoms: Since a severe attack of influenza ten years previous, the patient had had recurrent attacks of supposed chronic appendicitis not relieved, however, by appendectomy two years ago, elsewhere. She had crampy pain near the navel, occurring as soon as she ate and relieved only by vomiting. Loss of fourteen pounds in the two years since her appendectomy (from 110 to 96 pounds). *Fluoroscopy* showed stasis in the duodenum with active antiperistalsis. Some delay was seen in passage of barium past the root of the mesentery. *Duodeno-jejunostomy* was done on January 13, 1934, by Dr. George Earl. *Fluoroscopy* on March 1, 1934, revealed a direct and free emptying of barium through the stoma. No barium went around the natural route. No stasis nor antiperistalsis were seen. *Check-up on March 23, 1935*: Weight ninety-eight pounds. If she ate more than a light meal, she had crampy pain, nausea and vomiting. She had been working in an office all winter. The patient was enthusiastic about the result of her duodeno-jejunostomy, for she had been incapacitated for work prior to this operation. *Result*: "Fair."

Summary

In this series of eight duodeno-jejunostomies, there have been three cures, two good results and three fair results. None has failed to get some relief, though in a few cases such relief has been slow in manifesting itself. There have been no operative deaths, and none of the patients have been made worse. None of our cases belonged to the classical giant duodenum group where this operation produces spectacular results. Most of these patients before operation would have been labeled as neurasthenics or as suffering from gastric neuroses. All of them had had previous operations for the same general symptoms, without any relief. All of them failed to obtain any permanent relief on a careful medical regime lasting several months in each case.

I believe duodeno-jejunostomy should be performed far more frequently in the future whenever duodenal stasis is found and when it fails to respond to a careful medical regime. It drains the obstructed portion of the duodenum without disturbing the physiological or digestive mechanisms of the upper gastro-intestinal tract.

Conclusions

1. A discussion is presented of chronic duodenal stasis with a review of the more important contributions from the literature on this subject.

2. Case reports are submitted of eight patients presenting moderate to severe degrees of this syndrome who failed to obtain relief on a careful and prolonged medical regime. All were subjected to duodeno-jejunostomy.

3. Follow-up contacts with all of these patients for periods varying from eighteen months to four and one-half years have shown the end-results of this operation to be the following: three are classed as cured, two as having had a good result, and three as having had a fair or satisfactory result. None were made worse and there were no postoperative deaths.

4. It is urged that more emphasis be placed on the very frequently occurring syndrome of duodenal stasis, and that when the patients fail to respond to a careful medical regime, they be subjected to duodeno-jejunostomy. This operation often secures for the patient remarkable relief of symptoms even in the absence of a "giant" duodenum.

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FRACTURES OF THE NECK OF THE FEMUR*

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MUCH of the misunderstanding in the evaluation of methods of treatment of fractures of the hip has been the result of lack of appreciation of the pathology. Fractures through the neck of the femur, true intracapsular fractures, have not been clearly distinguished from fractures through the trochanter. Whereas the former seldom unite unless properly treated, the latter almost invariably unite regardless of treatment, though malposition with shortening of the extremity is a common sequela.

The abduction method of treatment, sponsored so vigorously by Royal Whitman, gradually displaced the older methods of treatment by traction. It has long been recognized that traction by weight and pulley is inadequate. Traction combined with countertraction on the thigh so as to rotate the thigh internally, which is known as the Ruth Maxwell method, was popular in the Middle West and was sponsored in Minnesota by the late Dr. James Moore, then Professor of Surgery at the University of Minnesota. While it gave improved results over ordinary traction, the difficulty of maintaining the traction and countertraction seriously interfered with its effectiveness. Various manners of applying the Whitman type of treatment have been advanced. Whitman advised a single spica cast extending from well up on the thorax to the toes on the affected side, with the leg well abducted and rotated inward somewhat. With Whitman's method, the results, on the whole, have been reasonably good when the cardinal principles of reduction, locking of the fragments together by abduction and internal rotation, and maintenance of the position were faithfully carried out. The most accurate statistics are those collected by the American Orthopaedic Association, but even these figures are open to criticism. Inasmuch as these figures have been supplied by men experienced in the treatment of fractures, their estimate of the occurrence of bony union in about 50 per cent of fractures of the neck of the femur, in

which the Whitman method has been employed, may be assumed to be rather accurate. No mention in such a report, however, could be made of the disagreeable features incident to the treatment, such as the prolonged confinement in a cast for three months, with the wasting of muscles and the stiff knee, which often fails to limber up properly and usually causes more discomfort than the fractured hip. The death rate varied greatly in the collected series mentioned. A fairly high percentage, at least 15 per cent, of elderly people will die following a fracture of the hip. If a fracture of the hip is treated regardless of the age and condition of the patient, a high mortality will be encountered, whereas, if the surgeon withholds active treatment until it is evident that the patient will at least survive the initial shock of the fracture, the mortality will be much lower. In some of the larger metropolitan hospitals, the death rate is considerably higher than 15 per cent.

Several facts should be considered in treating fractures of the hip by the Whitman abduction method: First, about 50 per cent of the fractures of the neck of the femur so treated unite by bony union; second, the treatment is a trying ordeal for the patient because of the confinement in a cast; third, the stiff knee which almost invariably follows cannot be lightly dismissed; and fourth, the mortality, though varying in different reports, seems to be in the vicinity of 15 per cent.

The fact that bony union was obtained in only 50 per cent of the cases leads one to inquire why such a high percentage of failures occur.

The reduction of the fracture must be complete. Absolute proof of reduction can be furnished only by good roentgenograms, which should include both anteroposterior and lateral views. Clinical signs alone are not sufficient. If the fracture is not perfectly reduced, one should not be satisfied unless approximately four-fifths of the fractured surfaces are in contact. Adequate fixation to hold the reduced fragments in position must be provided and it is generally agreed that a proper fitting spica cast is the simplest and best means to secure this fixation.

*From the Section on Orthopedic Surgery, The Mayo Clinic, Rochester, Minnesota. Read at the meeting of the Northern Minnesota Medical Society, Duluth, Minnesota, August 12 to 14, 1935.

Some patients cannot stand the treatment because their physical condition, nervous stability, or possibly both, are such that confinement in a cast for three months is entirely too much for them. Sometimes, owing to the entreaties of the patient and the family, the surgeon is induced to reduce the cast in extent, and, if this is carried too far, mobility of the hip is permitted and the fragments separate. Some fractures of the neck of the femur are so comminuted and the capsule so torn that shreds fall in between the fractured surfaces and stay there in spite of attempts at reduction, and nonunion results because there is not sufficient contact of the bony surfaces to bring about union, even though the patient is kept in the cast for the customary full three months. The uncontrollable and uncertain factor of circulation to the head of the femur is very important. Poor nourishment of the head of the femur may mean that bony atrophy at the line of fracture develops to such an extent that the fragments separate. No cast, however well applied, can absolutely prevent motion because the soft parts, the heavy muscles and fat of the buttocks, are so thick in this region.

Considerable discussion regarding the blood supply of the head of the femur recently has appeared in the literature, but I have neither time nor space to consider it in this paper. Santos published an excellent article in 1930. It appears that in a certain percentage of cases, probably 20 to 30 per cent, the heads of the femurs have no blood supply through the ligamentum teres and, consequently, when fractures occur in these cases, this source of blood supply, which I believe is a really important one, is lacking and atrophy of the head of the femur and partial necrosis are almost certain to occur.

If any better results are to be looked for than those obtained by Whitman's method, an attack on the fracture by open operation must be resorted to. Such procedures, however, must be undertaken with considerable caution. The surgeon must be qualified to perform such an operation, the operating room must be properly equipped, and the personnel must be experienced and well trained in surgical technic. The hip is difficult to operate on because it is deeply placed and surrounded by heavy muscles, and in most women by a great amount of fat.

The advice of Smith-Petersen, of Boston, that these fractures should be reduced by an open op-

eration, that each step should be visualized, and that fixation should be provided by a metal nail, has met with deserved attention. Whereas fractures of the neck of the femur previously had been treated sporadically by operation, Smith-Petersen was the first to advocate an orderly surgical attack.

In reviewing the recent fractures of the neck of the femur which have been seen at The Mayo Clinic, I found that nine of the patients had been treated by open operation, in which a beef-bone screw or peg was used to maintain the fragments in the corrected position. The reason for this type of treatment was because it was difficult to reduce the fracture and to maintain the fragments in the proper position. In almost all of these cases the capsule was found to be torn and interposed between the fragments. One patient died on the twenty-eighth day, of pulmonary embolism; the remaining eight obtained bony union. While this is a small series of cases, the results were so good that I felt that Smith-Petersen's premise was well taken and that open operation was worthy of further trial, for there did not seem to be any likelihood of improving the results with the Whitman method. Accordingly, in the last two years at the clinic, all patients who came in with recent fractures of the neck of the femur and who were considered to be good surgical risks have been treated by open operation.

With this background and experience, I now believe that surgical treatment by the open method with adequate internal fixation not only gives better results than the conservative abduction treatment, but practically does away with the cast and shortens the period of inactivity. Usually, ten days to three weeks in a short spica cast is sufficient. This does away with the stiff knee, which is a frequent sequela of fractures of the hip. The patient is allowed up on crutches at the end of that time. The clinical picture of the convalescence is such a contrast to the long, dreary, monotonous months incident to the abduction treatment in a cast that one cannot fail to be enthusiastic about the open reduction and fixation with the nail. Smith-Petersen's metal nail is large and strong, and an admirable agent to use, but other forms of internal fixation doubtless could be used. Gaenslen advised the use of two or three Kirschner wires inserted at different angles. Other ideas have been advanced

which I will not have time to discuss today but will confine my remarks solely to the use of the Smith-Petersen nail. Some years ago, Johansson, of Gothenburg, Sweden, advocated the use

be inserted without exposure of the site of fracture. It is surprising how difficult it is to insert the nail accurately without such a guide. No trauma is produced with the wire and it can be

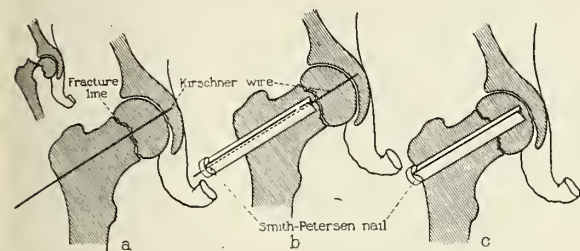


Fig. 1a. Kirschner wire *in situ* through the trochanter, neck, head and penetrating the acetabular wall. The insert represents the fracture before reduction; b, Smith-Petersen nail threaded over the wire; c, the wire removed, leaving the Smith-Petersen nail in position.

of a nail which was cannulated so that it could be threaded over a Kirschner wire previously placed in the position desired for the insertion of the nail. The position of the wire is controlled by aid of either the fluoroscope or anteroposterior and lateral roentgenograms. King, of Melbourne, Australia, advised the same method and the cannulated nail is now used at The Mayo Clinic (Fig. 1). The wire enables one to use the nail without exposing the fragments. The method erroneously has been called "blind" insertion of the nail. The nail is not inserted blindly, but is, in fact, very much controlled, for it is threaded along the wire and driven in only after the surgeon is certain that the wire is in the correct line. Smith-Petersen felt that the exposure should be adequate to enable the surgeon to visualize the fracture and make certain that shreds of capsule and fragments of bone do not interfere with the accurate reposition of the fragments. Basing my opinion on a rather limited experience with both methods, I am inclined to believe that Smith-Petersen may be right but such a major surgical procedure is safe only in the hands of the experienced surgeon. Although the insertion of the nail on the wire prolongs the operation because of the time required for the development of the roentgenogram, it causes no shock to the patient.

As already mentioned, anteroposterior and lateral roentgenograms should be made after reduction, to be certain the reduction is correct. The use of a Kirschner wire as a guide assures accuracy and is especially desirable if the nail is to

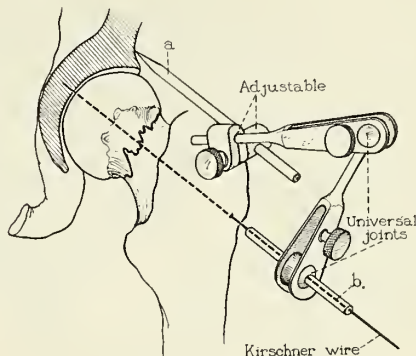


Fig. 2. Device for alignment of the guiding wire. The wire engages the acetabulum to steady the head when the nail is driven in.

withdrawn and reinserted until the roentgenograms show that it has been placed accurately. There have been many instruments and schemes advised for the alignment of the wire. The trochanter is exposed by a longitudinal incision, four inches in length, and the muscles are stripped back. A simple little device, which has been designed by my associate, Dr. H. B. Macey, is illustrated in Figure 2. This consists of several parts, one of which is a firm spike-like nail that is inserted snugly along the top of the trochanter and driven gently into the iliac wall, just above the margin of the acetabulum. The line thus established along the top of the trochanter parallels very closely the angle of the neck and the shaft. The upper arm of this device, which has a universal joint, is then slipped on the nail, and the cannulated piece on the lower arm, which also has a universal joint, is aligned in what the surgeon considers the direction the wire must take to enter in the middle of the neck and head of the femur. If this line is satisfactory, the Kirschner wire is slipped through the cannulated piece in the lower arm of the device and forced through the neck and head of the femur and into the acetabulum. The latter step is important because it steadies the head of the femur and prevents rotation as the Smith-Petersen nail is being driven in. Anteroposterior and lateral roentgenograms then are made to be sure that the wire has been placed correctly. If the wire is in the proper position, the instrument

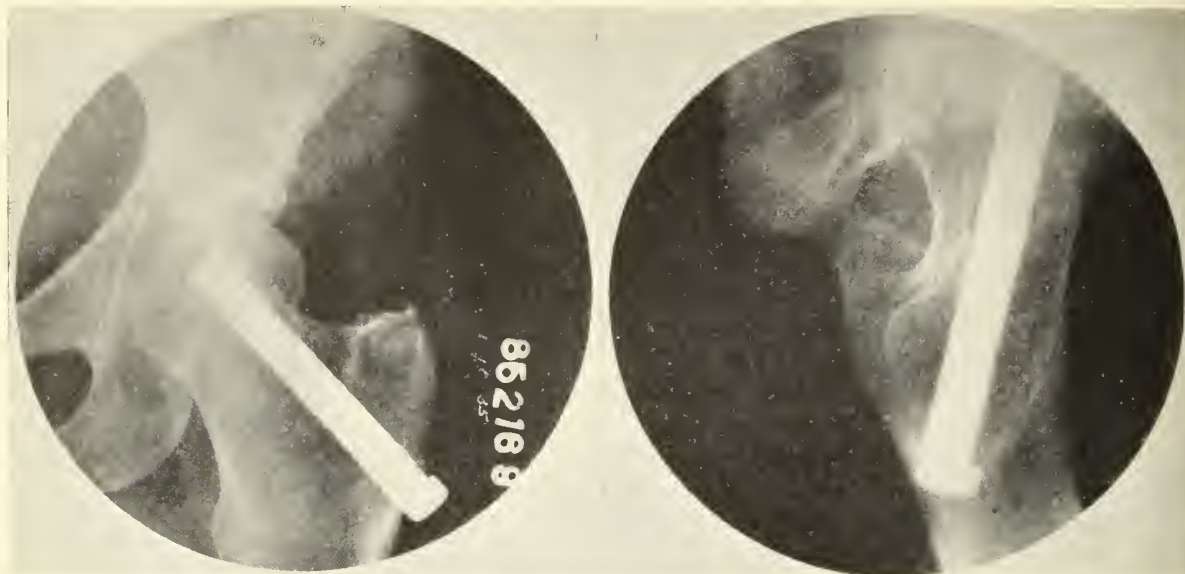


Fig. 3. *Left.* Nail *in situ* after ten months, with firm, bony union; anteroposterior view. *Right.* Lateral view.

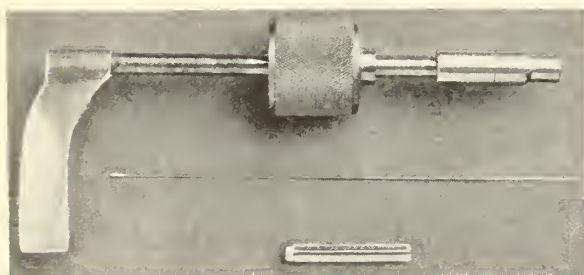


Fig. 4. Pistol grip hammer with sliding weight pounder. Kirschner wire and Smith-Petersen nail. A channel is provided in the shaft of the hammer for insertion of the wire.

is withdrawn, the wire is left in position, and the nail is driven in over the wire (Fig. 3). A special hammer is used for this purpose (Fig. 4). Measurements are made from the roentgenogram to determine the depth to which the wire is to go and also to determine the length of the nail required. Anteroposterior roentgenograms again are made to be sure that the nail has not been driven too far and does not engage the acetabulum. If it has entered the acetabulum, it should be withdrawn far enough to permit free motion of the head of the femur.

An operation of this nature is not easy. It is difficult to maintain asepsis and prevent contamination while making the roentgenograms, and the personnel of the operating room must be on the watch for any slips in aseptic technic. The development of the roentgenograms takes con-

siderable time and sometimes necessitates the patient being on the operating table for several hours. Inhalation anesthesia is dangerous for such a prolonged operation if the patients are elderly, and spinal anesthesia is preferable.

When a patient sustains a fracture of the neck of the femur, I believe that, with this new method at one's command, the ideal way to handle such a situation would be to have the patient taken to a hospital and placed on a comfortable stiff bed, apply traction to relieve the pain, and maintain as good a position of the fragments as possible. Roentgenograms should be taken in anteroposterior and lateral directions. Then one should wait at least several days, perhaps even a week or two, to see how the patient is going to react to the accident. If at the end of such a period of observation, the patient is in good general condition and, generally speaking, is considered a good surgical risk, then I believe he should be given the benefit of this new method of treatment. Such operations should only be done by those who are prepared to carry out the technic meticulously and who have the necessary physical equipment at hand, as fracture table, portable x-ray machine, instruments, and so forth.

I believe that with such management a large number of elderly patients who sustain fractures of the neck of the femur will obtain bony union, and incidentally will enjoy a more com-

fortable and easy convalescence than they would if other methods were employed.

In seven cases of recent fractures of the neck of the femur in which operation was performed at the clinic and a Smith-Petersen nail was threaded over the Kirschner wire, convalescence has occurred, and I am able to speak of both the convalescence and end-results. All of these fractures have united by solid bony union and the resulting mobility of the hip and knee is much better than that secured by the Whitman method. Six of the patients were women, who were twenty, forty-nine, sixty-four, sixty-six, sixty-seven, and eighty years of age respectively. The only male in the group was seventy-two years old.

Without reporting details of each case, it is sufficient to say that the experience of treating these patients by this method was most pleasant and in marked contrast to the conservative abduction method.

The patients were not faced, at the beginning of their treatment, with the prospect of spending three months in a cast, which always is a most discouraging outlook. They were placed in wheelchairs in a few days, the cast in most cases was removed in ten to twenty-one days, and movement of the knee started at that time.

I prefer to use a sling attached to an overhead bar so that the patient can move the knee and also the hip, while recumbent, by pulling on a rope. Weight-bearing must not be permitted until bony union is evident in the roentgenogram. Crutches can be used as early as three weeks in some cases. There has been no death in any of the fourteen cases in which the nail has been used at the clinic. In seven of these cases convalescence has been completed. In some of the other cases in which the nail has been used, there were ununited fractures, but this is a different story and cannot be discussed here. Infection did not occur, although a slough of a skin flap in a fleshy woman caused concern. The early mobility should reduce the occurrence of pulmonary embolism.

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CLINICAL NOTES ON THE RESULTS OF FEVER THERAPY IN DIFFERENT DISEASES*

Report of the Fifth Annual Fever Conference, Dayton, Ohio, May, 1935

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SOME physicians look with suspicion, not always unjustified, on anyone who uses machines in medical treatment. It is their opinion that all "machine-medicine" is tinged with quackery, that even if the deus ex machina is a benign god, he should nevertheless be considered an unorthodox deity. Fever therapy is the newest form of physical therapy. It has had its origin in the laboratories of scientists of national and international repute. Its utilization has so far been entrusted almost exclusively to physicians associated with large clinics and research institutions, men familiar with accurate methods of

clinical investigation. As yet few charlatans have been able or dared to invade the field.

Although strenuous efforts have been made to couch clinical reports in the most conservative terms, fever therapy is still enjoying its "honeymoon-period," and marked differences of opinion exist as to its actual merits. The recent Annual Fever Conference gave another opportunity for those most interested in its development to exchange clinical impressions and experiences, to level deviations of thought due to optimisms and pessimisms. In the two-day session, forty papers were presented before a selected group of 120 physicians and physicists, practically all of whom were connected with university clinics or large

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hospitals with research facilities. Two men responsible for the modern development of fever therapy were in attendance—Dr. W. R. Whitney, and Mr. Charles F. Kettering, heads of the research departments of the General Electric Company, and General Motors Corporation, respectively.

On disease processes fever therapy may have a direct influence through its bactericidal or bacteriostatic effect on certain organisms, or an indirect influence by vasodilation, by mobilization and augmentation of certain immune bodies, and by increasing metabolism. The most striking results are of course seen in those diseases caused by organisms on which fever exerts a direct effect, gonorrhea and syphilis.

Gonorrhea and Its Complications

The thermal death time of 130 strains of *Neisseria gonorrhoeae* in vitro at 106.7° F. (41.5° C.) has been found to vary between six and twenty-seven hours. Old laboratory strains are more heat-resistant than fresh cultures. A patient may be infected with more than one strain. The strains of a patient and his consort generally have about the same thermal death time. When a patient exhibits strains whose thermal death times vary rather markedly, he is probably affected by an old as well as by a new infection. Strains isolated from the urethra and from joints may have different thermal death times. Articular strains are a little less heat-resistant than urethral strains; therefore, gonorrheal arthritis may subside more readily during fever therapy than urethritis. When estimation of the thermal death time of the patient's own strain of gonococcus is possible, some⁵ advocate the application of a single, prolonged fever session of a number of hours (five to seventeen hours) at 106.7° F. (41.5° C.) equivalent to the thermal death time of the strain under treatment. Immediate subsidence of all symptoms and bacteriologic "cure" was obtained by every one of eleven patients so treated. However, similar results were obtained in several cases when the fever period was a fourth to three-fourths of the thermal death time, suggesting the assistance of defense factors in the body. Failure in cases in which sessions of fever are shorter than the thermal death time may be due to the inability of the host to supply the necessary supplemental resistance

when the bactericidal effect of the fever has been inadequate.

Since routine estimation of the heat resistance of patients' own strains is not yet practicable, most physicians favor a number of relatively short sessions of fever rather than one long session. Certain strains may become heat-resistant after a few short sessions, and partial failure may result in some cases of gonorrhea in which patients are treated less than twice a week and at temperatures lower than 106 to 107° F. In general, the results of fever therapy for gonorrhea in various anatomic sites have been excellent and, except for one dissenting opinion,¹⁷ it was agreed that it is the method of choice and almost "specific."

Gonorrheal urethritis, epididymitis, and pelvic disease.—The great majority of about ninety-five men with acute urethritis were promptly cured by a few sessions of fever (each of about five hours at 106 to 107° F.) as were also most of forty-four with acute epididymitis and several with acute prostatitis.^{1,3,7,12} Smears and gonococcal complement-fixation tests became negative. Patients with chronic infection may need supplementary local treatment. Of 118 additional patients with genito-urinary gonorrheal infection treated by one session (five to seventeen hours) of fever at 106.7° F. (41.5° C.) 80 per cent became clinically and bacteriologically negative and have remained so for three months to three years.⁵ In the treatment of gonorrhea of the female pelvis the combined use of fever therapy and either pelvic diathermy or Elliott treatments may be more effective than fever therapy alone. By the combined method of fever therapy and the Elliott regimen, one or two less treatments are necessary than with fever therapy alone.²⁷ Some workers insisted that vaginal or rectal diathermy is a more effective supplemental treatment than the Elliott regimen.⁴ Treated by a general temperature of 105° F. by fever cabinet or diathermy and a vaginal temperature of 110° to 111° F. by vaginal diathermy electrodes thirty-seven of forty-one patients became bacteriologically negative after one to three sessions. Complicating salpingitis generally subsided rapidly. In three cases in which the cervix, but not the urethra, became sterile, electrocoagulation of Skene's ducts was effective. To avoid damage to tissue, vaginal temperatures should not be greater than

110° to 111° F. When diathermy is used to raise the general temperature, the use of four rather than two external dispersive electrodes is preferable, to avoid tender indurations.

Gonorrheal arthritis.—Of a total of 143 patients with gonorrheal arthritis, about 70 per cent became symptom-free and 10 per cent received marked relief from fever therapy. In about 20 per cent of cases^{1,4,5,14,18,20,24,29,30,31} little or no relief was obtained. The results were much more marked in acute than in chronic cases. One hundred and eighteen of the 143 cases were of acute arthritis: 80 per cent of the patients were "cured," 10 per cent were markedly relieved. Of the twenty-five patients with chronic gonorrheal arthritis (of more than six weeks' duration), 40 per cent were cured, 30 per cent markedly relieved.

Syphilis

The work of Wagner-von Jauregg and others has indicated that the spirochete of syphilis is susceptible to temperatures available in fever therapy. The thermal death time of the *Spirochæta pallida* at 102.2° to 105.7° F. (39 to 41° C.) is about 3 to 5 hours. The clinical value of fever therapy in neurosyphilis is definitely established, but current belief is that the combination of fever therapy and chemotherapy is more effective than either one alone. Many have replaced the use of malarial or other forms of fever induced by organisms with that induced by machines, and have presented statistics indicating as good or better results and a lessened mortality with the latter. Others still consider malarial fever more effective. Sufficient experience has not yet been obtained to settle the argument.

Neurosyphilis.—Regardless of the thermogenic method used, clinical remissions should not be expected in more than 50 per cent of cases.²⁸ Of a group of patients with paresis who were treated by diathermy fever and chemotherapy, in only about 25 per cent was the disease arrested as compared to clinical remissions in 49 per cent of those treated by malaria and chemotherapy.²⁸ The statistics of other workers, however, favor artificial fever rather than malarial fever.^{3,10,26} Several patients with neurosyphilis which was unrelieved by malarial therapy obtained marked improvement from artificial fever.²⁶ Varying

degrees of improvement were reported in the treatment of tabes, taboparesis, paresis, dementia paralytica, diffuse syphilis of the central nervous system, asymptomatic neurosyphilis and resistant seropositive syphilis. Forty per cent of each of two groups of patients with paresis obtained "clinical remissions" or "very good results."^{14,16} Of two groups of patients with dementia paralytica, about 70 per cent of each were "rehabilitated" by the combined use of chemotherapy and fever from electric blankets or heated, air-conditioned cabinets.^{19,27} Speech, gait, and mental symptoms were improved. The gait of tabetics is often markedly improved; that of "burned out tabetics" is not improved, but pains can generally be abolished.²⁷ In some of these diseases there was a correlation, in others none, between the clinical improvement and alterations in serologic findings. Sometimes both were improved; often the serologic findings were unchanged but the cell count and colloidal gold test were markedly improved. Observations in these cases have been continued after treatment for from six months to three and a half years. The mortality reported in the different groups varied markedly and depended chiefly on the selection of cases and on the duration of the observation time. In comparing the mortality of groups treated by artificial fever as compared to that of those treated by malarial fever, one must remember that many of the deaths, probably the great majority, are due to neurosyphilis and not to malaria or artificial fever.

Differences of opinion exist as to whether best results can be obtained when chemotherapy is given simultaneously with, or after a course of, fever sessions. Some believe the combined method is more effective when the drug is given one-half hour before a session of fever is begun. Greater diffusion of the drug is presumed. Others obtained about the same results whether the two were given consecutively or concurrently.¹⁵

Primary and early secondary syphilis.—Because of results obtained in late syphilis, and in order to prevent the occurrence of the latter if possible, the combined use of fever therapy and chemotherapy has been advocated in the treatment of early syphilis.²⁷ A minimal course is ten sessions of five hours each, at a temperature of 105° to 106° F. (40.5° to 41.2° C.). The

concurrent use of drugs with fever is preferred to their consecutive use.

Tuberculosis

Temperatures available in fever therapy do not materially affect bovine or avian strains of *Mycobacterium tuberculosis*. They have no bacteriolytic, but may exert a bacteriostatic, effect on human strains. Experience to date in thirty-four cases of pulmonary tuberculosis indicates that fever therapy is of no definite value and is in some cases harmful. Cavities are not closed and sputums do not become negative.^{2,9} Experimental tuberculosis induced in animals by human, bovine, and avian strains was not materially affected by fever therapy.^{5,8,21} Indeed many of the animals treated by fever exhibited more extensive lesions than those not so treated. Fever stimulates metabolism much as strong physical exercise does. As the latter is known to be often harmful in tuberculosis, it is not surprising that fever therapy is apparently not beneficial.²⁷ One patient with pelvic tuberculosis and one with tuberculous arthritis obtained no improvement.^{9,17} Fever therapy may have exerted a beneficial effect in two cases of tuberculosis of the urinary tract. The urine became negative and has remained so for one year in a case in which a patient had previously had one tuberculous kidney removed and tuberculous epididymitis and nephritis of the remaining kidney later developed.⁹ A patient with pyuria, hematuria, and tuberculous bacilluria, whose pyelogram and cystoscopic examination indicated early unilateral renal tuberculosis, received two courses of seven sessions of fever each (four hours at 106° to 107° F.). Subsequently, the urine and the pyelographic shadow became normal and the patient has for several months been symptom-free.²²

Chorea

Results in twenty-eight cases of Sydenham's chorea were reported.^{7,14,23,24} Each patient was subjected to from four to twelve fever sessions, each session being three to four hours at 104° to 106° F. Many were "cured," the majority were notably improved. Some had previously been unrelieved by typhoid vaccine reactions. When results were incomplete, inadequate doses of fever were held responsible. An associated rheumatic endocarditis was not a contraindication.

Subacute Bacterial Endocarditis

Results of fever therapy in eight cases of subacute bacterial endocarditis would indicate that it may prolong the patient's life and make him more comfortable for a while.^{4,12,13,24,26} Patients may have less fever and night sweats and may gain weight thereafter. Blood cultures generally remain positive and alterations in the size of the liver and spleen and in the character of the urine are generally unchanged. Death apparently is but postponed. Because of the increased velocity of the circulation incident to fever therapy the danger of increased formation of emboli is present. At least one patient died from an embolus shortly after a session of fever.⁴ It is best to treat patients with this disease before any, or many emboli appear.²⁷

"Nonspecific" Arthritis

Of 129 patients with atrophic (infectious, proliferative, rheumatoid) arthritis who were treated by fever therapy less than 10 per cent became symptom-free, about 30 per cent obtained notable relief.^{14,29,30,31} The results were in general disappointing but were better in acute cases. Of the 129 cases twenty-one were acute, 108 chronic. Ten and 5 per cent, respectively, of the patients became "symptom-free," 40 per cent and 30 per cent, respectively, were notably relieved. Similar results were reported from this clinic in sixty additional cases.⁷

Of ten cases of hypertrophic (senescent, degenerative, osteo-) arthritis, improvement was noted in only four.³¹

Asthma

Fever therapy was employed in at least twenty-five cases of intractable asthma of the intrinsic or allergic type. None of the patients had previously received appreciable relief from other measures. Many were markedly incapacitated and unable to work. Some required oxygen and had been placed in an oxygen tent. In one group of six cases, complete remissions for at least seven months were obtained with five patients treated by three sessions of fever of five hours each at 106° to 107° F.²² In another group of fourteen cases the average duration of the asthma was eight years. Six patients were "markedly improved" by two to eight sessions of fever of four to six hours each at 104° to 106°

F. The relief, however, was but temporary, remissions lasting only one to three and a half months. Further treatment induced subsequent remissions.²⁵ One worker noted no relief in three cases.¹⁴

Peripheral Vascular Diseases

In the treatment of peripheral vascular diseases by fever one should be content to produce vasodilation and not try to kill some unknown causal bacteria. Temperatures greater than 102° F. may initiate serious skin burns or provoke gangrene.^{4,7,17,31} Reduction of claudication and pain and improvement in collateral circulation were noted in three cases of thromboangiitis obliterans and in two cases of obliterative arteriosclerosis.^{4,13} Six sessions of fever, each of four to five hours at a temperature of not more than 102° F., were employed.

Ocular Lesions

Gonococcal iritis responds notably to fever therapy.²² Good results were reported in the treatment of specific and nonspecific ocular lesions of the ulcerative type,^{2,21} in iritis, in syphilitic keratitis and phlyctenular keratoconjunctivitis,²² and particularly in the exudative lesions of ocular syphilis.⁶ Evisceration of an infected eye subsequent to a penetrating wound was occasionally avoided by fever therapy.²¹ In ocular syphilis, fever therapy is best combined with chemotherapy. Optic atrophy is not a contraindication to hyperpyrexia.⁶

Staphylococcal Infections

Staphylococci are not killed even by the application of 100 hours of heat at 106.7° F. (41.5° C.). Staphylococcal infections would thus seem to be impervious to fever therapy. However, a diabetic patient with an apparently hopeless case of staphylococcal septicemia was reported as having recovered after fever treatments prescribed in desperation.²¹

Miscellaneous Conditions

At this stage in the development of hyperpyrexia it is natural to try it in a large number of conditions in order to define the limits of its usefulness. Swapping experiences in informal discussions, the conferees noted the admittedly preliminary results of fever therapy in a miscellaneous number of conditions.

Results in a very few cases of the following diseases were sufficiently promising to suggest further clinical trial: sciatic neuritis,^{3,14} multiple sclerosis, toxic infectious psychosis, osteomyelitis, undulant fever, and psoriasis. "Satisfactory remissions" were induced in more than 50 per cent of seventeen cases of multiple sclerosis.^{3,14} In one such case in which there was marked generalized paralysis unimproved by other measures, a notable if temporary remission was induced by each of a series of ten daily sessions of fever.²³ Two workers reported rapid recovery of a few patients with toxic infectious psychoses after two sessions of fever each.^{3,26} Since spontaneous cures occur and the disease is often of short duration, another worker doubted the value of fever therapy.²⁸ In cases of osteomyelitis with free drainage fever therapy may lessen the discharge and hasten recovery. When infection is walled off such treatment may do harm.^{10,21} Six patients were benefited. In two of the cases with intractable osteomyelitis of the facial bones, rapid recovery ensued after several sessions of fever. A marked recurrent hydro-arthritis associated with undulant fever was stopped thereby.²⁶ One patient with intractable generalized psoriasis and erythroderma unrelieved after seven months of hospital care obtained a notable remission after seven sessions of fever.²

It was noted that in the literature there are about fifty reports of cases in which malignancy notably regressed, either spontaneously or after intercurrent fever.²⁷ It was suggested that in certain cases of inoperable malignant growths roentgen therapy combined with fever therapy may give better results than roentgen therapy alone. Recalcification of bone and complete absence of disability, so far for eight months, has followed such combined treatment in one case of osteogenic sarcoma proved by biopsy.²¹ One patient with extensive cancer of the lung is still alive three years after such treatment.⁴

Preliminary observations would indicate that no appreciable effects are to be expected from fever therapy in the following: pyelitis,¹⁴ glomerulonephritis,¹⁷ epidemic encephalitis,³ or Parkinson's disease.¹⁴ From two to five patients with each disease have been treated.

Rheumatic carditis and controlled diabetes do not contraindicate the use of fever therapy. Pregnancy may or may not be a contraindication.

Whereas one pregnant woman treated for a severe associated pelvic gonorrhea died after fever treatment, several other pregnant women whose associated gonorrhea or syphilis seemed to demand fever therapy in due course delivered normal healthy babies. In selected cases, therefore, pregnancy is not a contraindication.²⁷

Management of Patient During a Session of Fever

Careful management of the patients during sessions of fever will make them more comfortable and lessen or prevent the side reactions to fever, such as restlessness, nausea, vomiting, tetany, with muscle cramps and pain, and heat prostration. Many of these symptoms are due to depletion in water and chlorides. It is customary to give the patient 2 to 6 liters of ice cold 0.6 per cent saline solution during sessions. This prevents loss of chloride and often prevents nausea. Some workers believe that less nausea occurs if a 0.3 per cent saline solution is used,² but it is believed that at least 90 to 100 c.c. of fluid per kilogram of body weight, containing at least 20 to 30 grams of sodium chloride, should be given.²⁰ If nausea and vomiting occur, they are usually stopped by the intravenous injection of 500 c.c. of a 10 per cent glucose solution⁷ or by the oral use of dilute hydrochloric acid.² The milder sedatives (codeine, nembutal, and sodium amytal) are preferable to the stronger ones (morphine, pantopan, and dilaudid), which should be reserved for the more difficult cases; less vasomotor depression results.⁷

For the occasional tetany, muscle cramps, or pain, the intravenous administration of 1 or 2 gm. of calcium gluconate is prescribed.^{1,27} If this does not give prompt relief the administration of carbon dioxide and oxygen is most helpful.⁷ A reduction in the tendency for nausea and tetany to develop can be obtained by feeding the patients fairly large doses of calcium and sodium chloride between sessions of fever.^{3,27}

The appearance of herpes labialis can generally be prevented by anointing the patients' lips with ammoniated mercury ointment (U.S.P.) repeatedly during the sessions.²

Untoward Reactions

Numerous physiologic studies have shown that the amounts of fever generally prescribed do not harm patients. Electrocardiographic studies,

for example, show no significant cardiac alterations. By now many hundreds of patients have been so treated. Only a very few deaths attributed to uncontrolled hyperpyrexia have been reported. In one series of 400 patients treated by a trained personnel no disasters were encountered.²⁷ Impending cardiovascular collapse can generally be recognized by the presence of a persistent pulse rate of 160 or more, and one of poor quality. In such cases the session of fever should be stopped or the fever temporarily reduced. If marked vasomotor depression or collapse occurs, 100 c.c. of 50 per cent glucose solution should be given intravenously, and caffeine or epinephrine as necessary. The inhalation of oxygen and carbon dioxide is helpful. A blood transfusion may be useful.²⁷

An occasionally serious and even fatal reaction is probably inevitable, as the administration of five to eight hours of fever at 106° to 107° F. puts some patients close to the borderline of disaster. Only three deaths were reported at the conference. A patient with multiple sclerosis died in vascular collapse thirty-six hours after the fifth session of fever. Previous sessions had been well tolerated. Cerebral and pulmonary edema, and focal necrosis of the liver, but normal suprarenal glands, were found at necropsy.¹³ A patient with neurosyphilis tolerated ten sessions well; after the eleventh session, coma, hemiplegia, and death ensued. A pregnant woman with acute gonorrheal salpingitis apparently tolerated three sessions well. Twitching spells developed during the week thereafter, and on the tenth day after the third session convulsions, coma, and death resulted. Necropsy in these two cases revealed hemorrhagic pneumonia, hemorrhagic encephalitis, and marked degeneration of the suprarenal cortex (zona fasciculata) and of the liver and kidneys. The pregnant woman also revealed degeneration of chorion, with intrauterine hemorrhage.²¹

Only 50 per cent of twenty dogs subjected to from seven to nine hours at 108° to 109° F. died. The lesions approximated those just noted: engorgement of blood vessels, hemorrhages, and degeneration. In view of the fact that sodium amytal produces marked vasodilation, perhaps it might be best to avoid its use in conjunction with temperatures already producing a marked similar effect.²¹

Conclusions

To date fever therapy, an essentially safe procedure when supervised by physicians and nurse-technicians trained in its administration, is chiefly of value for the venereal diseases, gonorrhea and syphilis, diseases in which actual bacteriolysis or destruction of the invading organisms can be accomplished. Further observation may indicate it to be very useful in certain other conditions also. The presentation of these preliminary observations on its use in a few cases of a wide variety of diseases should not foster unwarranted claims or lead to its haphazard administration, but it will indicate the trend of investigation and current opinions as to its field of usefulness.

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SUCCESSFUL TOTAL CYSTECTOMY FOR RECURRING CARCINOMA OF THE URINARY BLADDER

With Notes on Some Very Large Vesical Tumors

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TOTAL cystectomy for carcinoma of the urinary bladder is not common. Between 1924 and 1934, at The Mayo Clinic, there were 902 cases in which a clinical diagnosis of carcinoma of the bladder had been made and appropriate treatment instituted, but the procedure was carried out in only ten cases.

The surgical treatment of carcinoma of the bladder is dependent on the size of the tumor, its location, its degree of malignancy, the condition of the kidneys, and the condition of the patient. Transurethral fulguration of small localized tumors of a low degree of malignancy has been followed by good results. The operative risk is low, and periods of hospitalization and disability are extremely short.

Suprapubic exploration with segmental resection is the procedure of choice for large tumors involving resectable portions of the bladder, whereas transvesical electrocoagulation of tumors

involving the base of the bladder and the ureteral orifices has, in many cases, been followed by surprisingly good results. Such treatment has resulted in satisfactory palliation, and in prolongation of life and relief of symptoms in many cases, beyond that reported in cases of total cystectomy. The operative risk in the former procedure is less than 10 per cent as contrasted with a mortality of from 25 to 30 per cent reported in cases in which ureteral transplantation to the sigmoid and total cystectomy have been carried out. The risk is not in total cystectomy, but in ureterosigmoidal transplantation, in cases in which patients are suffering from a malignant process that has produced obstructed infected kidneys. If bilateral external ureterostomy is performed (an operation of little risk), total cystectomy is a relatively safe procedure. If the ureters are dilated, bilateral external ureterostomy is the indicated procedure, since such ureters cannot usually be safely transplanted into the sigmoid.

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A palliative cystostomy, with implantation of radium, has occasionally resulted in a surprising improvement and, in some cases, in three-year or five-year cures. If the growth is resectable and yet involves one of the ureteral orifices, the ureter may be reimplanted into the bladder, or ligated and dropped back, a procedure which results in the symptomless atrophy of the kidney in the absence of marked infection. Counsellor and one of us (Walters) recently reported a series of 600 malignant tumors of the bladder in which a five-year cure was obtained in 28 per cent of the cases.

Total cystectomy is not often indicated. Extensive tumors involving the whole bladder, but without extravesical metastatic involvement, can probably best be treated in this manner. Repeatedly recurring or multiple tumors which are beginning to spread despite adequate treatment occasionally require such a procedure. If the carcinoma has involved the ureteral orifices, resulting in hydro-ureter and hydronephrosis, complete removal of the bladder preceded by bilateral external ureterostomy may result in a cure.

Report of Cases

Bilateral External Ureterostomy Followed by Total Cystectomy

Case 1.—A man first came to the clinic in August, 1931, complaining of pain in the left costovertebral angle and intermittent hematuria of eight months' duration. Severe dysuria and terminal tenesmus accompanied by nocturia recently had developed and some tenderness and soreness over the pubis had been noted also. On physical examination there was a small adenoma in the thyroid gland, a moderately enlarged prostate gland, and tenderness over both kidneys. Laboratory examination revealed the urine to be full of pus, blood, and albumin. The blood urea was 40 mg. per 100 c.c. The phenolsulphonphthalein test indicated a 50 per cent excretion in two hours. On cystoscopic examination, numerous pedunculated tumors were visualized in the bladder; intravenous urograms revealed the outlines of the kidneys to be normal. Suprapubic exploration was performed, and all of the small tumors were removed or destroyed by diathermy. The pathologist reported each of the thirty-six tumors removed, which varied from 5.5 to 1.5 cm. in diameter, to be squamous-cell epitheliomas of grade 1. Postoperative convalescence was uneventful.

The patient returned in four months with a small suprapubic urinary sinus and two questionable areas of recurrence in the bladder. Because of his good general condition and reluctance to undergo further operative procedures, only the urinary infection was treated.

The patient returned again in six months, and sev-

eral minute areas of recurrence in the dome of the bladder were destroyed by electrocoagulation. The persistent suprapubic sinus was excised and the wound was closed. Some inflammatory and cicatricial obstruction had occurred at the right ureteral orifice and that ureter was dilated. Treatment of the urinary infection was only partly successful because of the hour-glass deformity secondary to the first operation.

Six months later, reëxamination disclosed another recurrence of tumor. Further operation was advised, but the patient decided to go home. He returned again in six months, however, and the areas of recurrence were a little larger. The bladder had contracted and about 50 c.c. of residual urine was present. The recurrent growths were fulgurated.

The next two examinations were also six months apart, and each time multiple recurring growths were destroyed by electrocoagulation.

In January, 1935, the patient was readmitted with recurrence of all of his old symptoms. His general condition was good and he had not lost weight. Cystoscopy revealed a small, contracted bladder with marked chronic cystitis and multiple tumors involving most of the bladder. Hugely dilated calices, pelves, and ureters were visualized in the intravenous urograms. Because of the ureterectasis, bilateral external ureterostomy, to be followed by total cystectomy, was performed. The ureters were brought extraperitoneally through inguinal incisions. Five weeks later the bladder and the distal stumps of the ureters were removed completely (Fig. 1); the peritoneal cavity was opened, but no evidence of carcinomatous extension was found. The postoperative convalescence was essentially uneventful and the patient was dismissed from the hospital on the twenty-first day after operation. He was equipped with a belt and rubber bottles which collected the urine draining from the ureterostomy tubes. He was dismissed from the clinic on the thirty-second day after operation in good general condition.

The large size of the ureters and the associated hydronephrosis made transplantation of the ureters to the rectosigmoid inadvisable at this time. Later, if as a result of complete relief of the ureteral obstruction (due to the vesical carcinoma) by external ureterostomy, the ureters, pelves, and calices decrease to normal size and resume their neuromuscular activity, it is possible that the ureters can be transplanted to the sigmoid. It is interesting to note that the grade of malignancy of the vesical tumors was the same at each of the seven biopsies.

Suprapubic exploration is carried out in all cases of vesical tumor not amenable to transurethral fulguration, even though the cystoscope or cystogram demonstrates the lesion to be extremely large. The following case forcibly brings out the point that a very large tumor may, on cystoscopic examination, appear to involve a

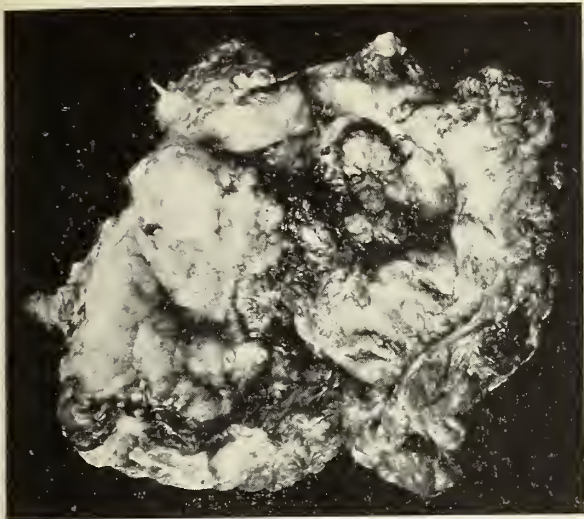


Fig. 1. Case 1. Total cystectomy for carcinoma.

large portion of the bladder, yet may have a small pedicle and be removed easily and completely by transvesical excision.

Case 2.—A white man, aged fifty-five years, came to the clinic, complaining of pain in the hypogastrium and dysuria, of sixteen months' duration. At the beginning of his trouble he had noticed mild dysuria, with hematuria at the end of micturition. Cystoscopy had been performed and he had been told he had a tumor of the bladder. Improvement in his symptoms had not resulted from some electrical treatments given elsewhere. Two subsequent cystoscopic examinations at different hospitals had led to the same diagnosis. He had been treated for diabetes. He had lost 70 pounds (31.8 kg.).

On physical examination, at the clinic, he appeared to be undernourished. Moist râles were present at the bases of both lungs and there was tenderness in the suprapubic region. Laboratory investigations revealed the urine to contain albumin, grade 3, erythrocytes, grade 3, and pus cells, grade 4. There was no anemia, but there were 20,000 leukocytes per cubic millimeter of blood. The blood urea, blood sugar, and the carbon dioxide combining power of the blood plasma were normal. The flocculation test for syphilis was negative. Roentgenograms of the abdomen were essentially negative. Cystoscopic examination revealed a large friable tumor that apparently involved the whole dome of the bladder. Specimens of the tumor for biopsy were reported to be squamous-cell epithelioma, grade 4. Intravenous urograms revealed that the calices and ureters were dilated, grade 3, on both sides.

The bladder was exposed through a low midline incision. The tumor, which practically filled the bladder, was attached by a narrow pedicle to the dome. It was removed completely (Fig. 2) and the base of the pedicle was destroyed by diathermy. There were no other areas of involvement and the wound was closed, leaving a No. 30 catheter in place for drainage.

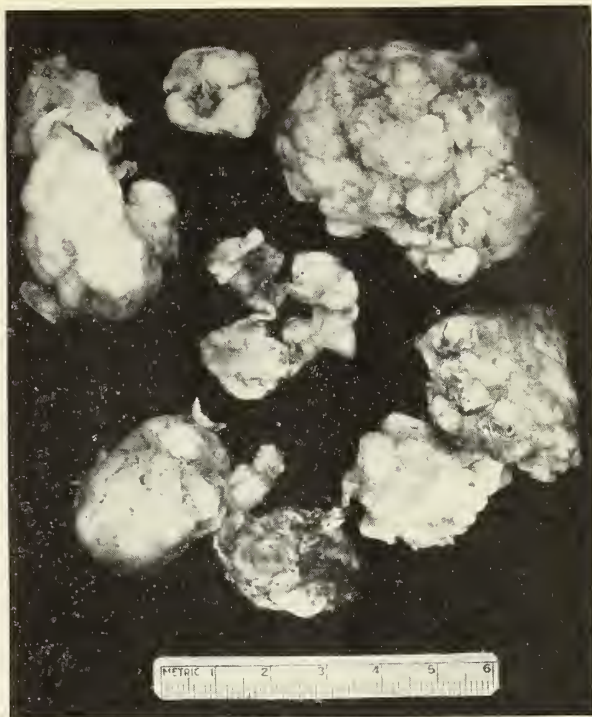


Fig. 2. Case 2. Squamous-cell epitheliomas of the bladder, grade 4.

Postoperative convalescence was uneventful and the tube was removed on the sixteenth postoperative day. The bladder was drained by a urethral catheter for three days and, after its removal, the wound remained dry. The patient was dismissed from the hospital on the twenty-third day and from the clinic on the twenty-seventh day after operation.

Summary

A case of successful total cystectomy for extensive recurring vesical tumors is reported. Preliminary bilateral external ureterostomy was performed rather than ureterosigmoidal transplantation because of the large size of the ureters and the associated hydronephrosis.

The value of suprapubic transvesical exploration in all cases of large vesical tumors is emphasized in Case 2. In this particular case a very extensive tumor, which almost filled the bladder, was found on cystoscopic examination. The lesion was of doubtful operability. At exploration, however, the tumor was found to have a very small pedicle and lent itself very readily to successful removal.

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PROSTATIC MASSAGE OR RESECTION?*

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CONFRONTED by a border-line case, the surgeon probably leans to the radical surgical treatment, while the internist is inclined to champion conservative methods. It is well that such an imbalance exists because it enables the profession to steer a middle course in therapy and leaves the patient as the beneficiary of a situation which insures sound judgment and wise treatment. In this regard, one of the most controversial subjects in the field of medical practice probably has been the treatment of the patient who is suffering from symptoms which are referable to his prostate gland. Unfortunately, a large majority of these patients suffer from symptoms which may well be attributed to obstruction from hypertrophied prostatic tissue, to obstruction of an inflammatory nature, or to simple inflammation with no obstruction. To distinguish these conditions requires careful examination, which most often should include cystoscopy, coupled with a good deal of experience on the part of the examiner. Not infrequently, however, even in the most expert hands, border-line cases furnish real problems in diagnosis. It is with these cases that this paper is concerned.

The older literature abounded with articles by ultraconservative men. Some of these articles demanded that prostatectomy should be abandoned, and maintained that most prostatic obstruction had an inflammatory basis and that massage and catheter drainage would relieve it. Within the last two decades, this teaching has gradually lost ground, as the pathology of prostatic disease has become better known. At present, the trend of opinion is that in cases in which there is definite lobar enlargement of the prostate, or in which cystoscopy reveals sclerosis of the vesical neck or the formation of a bar, which is sufficient to account for the symptoms and the residual urine, the removal of the obstructing tissue by some surgical method is the procedure of choice. Lobar hypertrophy usually does not present any difficulty in diagnosis. While the bars and contractures are not so easily diagnosed

as is simple lobar hypertrophy, the diagnosis is not difficult. These bars and contractures may give rise to marked obstruction with residual urine, which may or may not be infected, or they may produce marked frequency of micturition, and nocturia, with a clear urine and no residual urine. Their cystoscopic picture is definite, their diagnosis is easy, and their removal gives very good results. In several cases in which urinary obstruction has led to a catheter life, operation has disclosed only a median bar, and the removal of about 2 gm. of tissue by transurethral prostatic resection has relieved the symptoms completely. Another interesting example is the patient, often between forty and fifty years of age, who has a normal urine but complains of some difficulty of micturition, such as marked frequency, nocturia, and an inadequate stream. There usually is little or no residual urine. Resection of a median bar frequently relieves these symptoms completely.

There remains, however, a large group of cases that cannot be placed in these definite classes. This group includes the cases in which there are indefinite bars, contractures of the neck of the bladder, very slight lobar hypertrophy, or chronic cicatricial prostatic urethritis. Those physicians who do considerable urologic diagnostic work are aware that all prostatic disease cannot easily be sorted into two definite groups, namely obstructive and inflammatory. Histories often are misleading and a patient whose history seems to indicate a definite obstruction, at cystoscopic examination may be found to be suffering from chronic cicatricial prostatic urethritis. A typical history is of interest.

A man, aged sixty years, consults his physician, complaining of urinary trouble. He says that for the past three or four years he has had increasing difficulty in passing his urine; the stream has been slow and there has been dribbling at the end of micturition. The stream often has been difficult to start. He has had a gradually increasing nocturia and frequency during the day, until he now is getting up four or five times at night, and is voiding every one and

*From the Section on Urology, The Mayo Clinic, Rochester, Minnesota. Read before the Southern Minnesota Medical Association, Austin, Minnesota, August 25 and 26, 1935.

a half to two hours during the day. There also is some urinary burning and urgency. He volunteers the information that he does not feel as if he is emptying his bladder. Examination of a centrifugalized specimen of urine shows pus, grade 3. Rectal examination reveals that the prostate gland is firm and enlarged about 1+ (on a basis of 1 to 4) and a check of the prostatic secretion shows pus, grade 3. On checking the residual urine, it is found that a number 18 soft rubber catheter does not pass easily but there is no difficulty in passing a number 16 soft rubber catheter with a Coude tip. Seventy-five cubic centimeters of residual urine is found, which reveals leukocytes, grade 2, forty cells to the high power field.

Up to this time, the impression of the examiner has been that he probably is dealing with a definite prostatic obstruction, but certainly a cystoscopic examination must be done before the diagnosis is assured. At cystoscopy, there is some difficulty inserting the number 24 French cystoscope, and the examiner obtains the sensation of a tight and fixed prostatic urethra. This time, 90 c.c. of residual urine is found to be present. If the direct Braasch cystoscope is used, which is the one that is used routinely at the clinic for diagnosis of pathologic changes of the vesical neck, the picture will be somewhat as follows: The bladder is normal except for a mild trabeculation in scattered regions. The prostatic urethra is fixed, making it very difficult to manipulate the cystoscope, but there is no definite projection of prostatic tissue into the urethral lumen. The walls of the bladder seem to be flush with the prostatic urethra. Although the posterior lip of the neck of the bladder seems elevated, just as it is in the presence of a median bar, it is noticed that the ureteral orifices and ureteral ridge are on about the same level as the neck of the bladder, and very close to it, making it practically impossible to remove any tissue without cutting into the trigone of the bladder. This rules out the possibility of a bar. The cystoscope is next drawn out as far as the verumontanum, revealing a granular, rather ragged-looking urethral lumen, with some dilated prostatic ducts and an inflammatory or cicatricial looking verumontanum. The diagnosis here is obvious, namely, a chronic granular and cicatricial prostatic urethritis, which so commonly affects elderly men and produces practic-

ally the same symptoms as does hypertrophy of the prostate. The patient receives prostatic massage and irrigations of the bladder two or three times weekly, and possibly receives one or two dilatations of the posterior urethra. The symptoms disappear or are controlled satisfactorily. A large number of such patients are seen at the clinic and the results with conservative treatment are entirely satisfactory.

There is no doubt that some of these patients who obtain fair results with conservative treatment, later have an exacerbation of their symptoms and eventually require resection of a small amount of tissue in the vesical neck. Case 4, in the reports to follow, is illustrative of such a result.

Now consider the same history cited above but with different cystoscopy findings. This time it is noticed that the walls of the bladder are not entirely flush with the prostatic urethra and there may seem to be just a thin marginal curtain of intervening tissue between the bladder and prostatic urethra. Or, the posterior vesical lip may be elevated, forming a small median bar. The ureteral ridge is found to be at a considerably lower level than the posterior vesical lip and there may be a moderate bas-fond. From his experience, the cystoscopist feels that there is some obstruction present, which would indicate a bar, grade 1 or 2, or a contracture of the neck of the bladder of the same grade. However, because of its mild nature and the associated cicatricial granular prostatic urethritis, it is difficult to decide whether the difficulty is primarily obstructive or primarily inflammatory. The percentage of cases in which the cystoscopist will find himself in this quandary after cystoscopy will vary inversely with the amount of his cystoscopic experience, but no matter how voluminous his experience may become, he always will have plenty of such cases if he is conscientious and considerate only of the welfare of the patient.

A good number of cases that fall into this doubtful class are seen each year at the clinic. Our feeling in this matter is "when in doubt, give conservative treatment a trial first." Our procedure is to treat these patients with rather vigorous prostatic massage. Following this, the bladder is washed with a 1 to 8,000 solution of potassium permanganate. Two or three treatments are administered weekly for from two

weeks to a month or more. If the prostatic urethra is very cicatricial, the urethra is dilated once or twice. If there is an associated chronic pyelonephritis, it is treated with the ketogenic diet and acidification of the urine if the infection is of the bacillary type, or with two or three small doses of neoarsphenamine at intervals of five or six days if the infection is the result of cocci. If the symptoms do not show signs of remission and if the amount of residual urine does not diminish appreciably in this time, the inflammatory element is considered of secondary importance to the obstructive element and, therefore, the neck of the bladder is resected with the transurethral operation. The amount of tissue removed usually is very small, and ranges from 1 to 3 gm. in weight. Following this, the patient nearly always empties the bladder completely and the symptoms are controlled adequately. After a month or six weeks, prostatic massage may be instituted again if any symptoms persist, but usually this is not necessary.

During 1934, transurethral prostatic resection was performed in twelve such border-line cases in which a preliminary course of conservative treatment had failed to give relief of symptoms. One of these patients did not have any residual urine and one patient had only 15 c.c. of residual urine at the time of examination, but had had two attacks of acute retention. The rest of the patients carried from 30 to 200 c.c. of residual urine.

Questionnaires which were sent to these twelve patients brought response from all. Eight patients were more than satisfied with the results of their operations. A few still had nocturia and had to urinate one to three times each night, but aside from this, the urinary function was practically normal. Two patients still had symptoms of urinary obstruction. One of these was the only patient in the series who had not had any residual urine to begin with. He still complains of an inadequate stream, though the nocturia has improved somewhat. The other patient had 100 c.c. of residual urine when he came to the clinic. At that time he complained of marked urinary frequency every two hours, urinary urgency, and nocturia, which forced him to void one to two times each night. When he left the clinic, he did not have any residual urine but he now reports that the stream is no better than it was before the operation and that the urgency and

frequency have increased somewhat. Two patients were moderately improved. One of these reported that although his stream still was somewhat interrupted and not as large as he would like to have it, there was not any discomfort while voiding, the frequency during the day had decreased from hourly micturition to normal frequency, and the nocturia had been reduced so that he had to void only three times each night, instead of six times, as formerly. The other patient reported that the frequency during the day had decreased so that at the present time he was voiding seven times daily, instead of every hour as formerly. He was voiding four times each night, instead of six or seven times as formerly. The caliber and force of his urinary stream, however, were very slightly improved.

In answer to the question regarding the amount of residual urine present, only one patient had had a recent examination. This was the patient in case 7, who was the only patient who was allowed to leave the clinic while some residual urine still was present. He reported that the amount of residual urine was 30 c.c. There was 200 c.c. of residual urine at the time of his registration at the clinic. From the answers to the questionnaires, it can be assumed that all of these patients probably are emptying their bladders completely.

The results, as tabulated from the replies to the questionnaires, are listed in Table I. All in all, the results can be considered exceptionally good when one considers the chronicity of the condition.

For resecting these small glands, the Braasch-Bumpus resectoscope serves admirably. Resection should be wide enough to get down to the vesical fibers around the entire circumference of the vesical neck. With the cold cutting knife, this may be done accurately without any danger of deep burned portions sloughing later. The details of the technic have been fully described elsewhere. In these cases, it often is unnecessary to coagulate with the multiple needle electrode prior to removing each piece of tissue with the cold knife.

As will be seen from the summary of these cases, the pathologic diagnosis usually given in routine examination was adenofibromatous hyperplasia. However, the preponderance of the tissue usually is of the fibromatous or scar tissue type, and considerable areas of round cell in-

PROSTATIC MASSAGE OR RESECTION—EMMETT

TABLE I. RESULTS ON TWELVE CASES BEING REPORTED

Size of urinary stream	Condition of urinary flow	Amount of pain or burning on micturition	Number of times necessary to void in daytime	Nocturia
Good	Freely	None	Normal	None
Good	Good	None	7 to 8 times	1 to 3 times
Fair	Slow	None	Normal	1 to 2 times
Good	Freely	None	Normal	None
Good	Freely	None	Normal	2 to 3 times
Fair	Freely	None	Normal	1 to 2 times
Good	Freely	Very little	Normal	1 to 2 times
Good	Freely	None	Normal	1 to 2 times
Poor	Interrupted	None	7 times	4 times
Poor	Interrupted	Very little	7 to 8 times	2 to 3 times
Fair	Interrupted	Moderate	Every 30 minutes	3 to 4 times
Fair	Interrupted	None	Normal	2 to 3 times

filtration often are present. The tissue usually cuts with more resistance than does the tissue of the ordinary prostatic hypertrophy.

In this type of case, the surgical risk is slight. In spite of the prostatitis, if the resection is done widely enough so there is no straining afterward to urinate, there is practically no postoperative rise in the temperature. In these twelve cases, six of the patients did not have any increase in the temperature, three patients had an elevation to 100° F., one to 99.6° F., and two to 99.2° F. In most cases, the patients stay in the hospital from four to six days.

Report of Cases

The clinical histories of six of the cases in this series follow:

Case 3.—A white man, aged sixty-four years, complained of occasional slowness in starting his urinary stream. This had been noted for several years, but had increased in severity for a few weeks before his registration at the clinic. Acute urinary retention, which had necessitated catheterization, had developed two weeks before he came to the clinic.

When the patient was first seen at the clinic, he was voiding a fairly adequate stream. Examination revealed only 10 c.c. of residual urine. The voided urine contained leukocytes, grade 1. Rectal examination revealed a hypertrophy of the prostate, grade 1. The prostatic secretion disclosed leukocytes, grade 3, on a basis of 1 to 4.

Cystoscopic examination revealed chronic granular prostatic urethritis with dilatation of the prostatic ducts; bilateral, intra-urethral prostatic hypertrophy, graded 1+; and a median lobe, graded 1. The bladder was normal. The vesical urine, which was obtained by

catheterization, contained leukocytes, grade 1, but there was no growth on culture. The ureters were not catheterized.

Conservative treatment, consisting of prostatic massage and vesical lavage was administered for three weeks. The results of this treatment were only fair. The patient left to continue this treatment at home, but three weeks later acute retention recurred and he returned to the clinic.

A transurethral resection was done at this time, and tissue which weighed 3 gm. was removed. The pathologic examination revealed adenofibromatous hyperplasia. The period of hospitalization was nine days.

At the time of his dismissal from the clinic, the patient was voiding freely, had no residual urine, and felt satisfied with the results of the operation.

A response to a letter of inquiry stated that his stream is fairly adequate, rather slow, but is not interrupted. There is no difficulty in starting the stream. There is not any frequency, urgency, or burning on urination. He reported that he has to void one to two times each night.

Case 4.—A white man, aged fifty-four years, had had urinary frequency, urgency, and burning, and difficulty in starting his stream for three or four years.

Examination revealed no residual urine. There was a prostatitis, grade 4. The voided urine contained leukocytes, grade 1.

Cystoscopic examination revealed a median lobe, grade 1+ to 2; chronic granular prostatic urethritis, grade 2; and areal cystitis, grade 1. The vesical urine, which was obtained by catheterization, contained leukocytes, grade 1, and culture revealed micrococcus. The ureters were not catheterized.

Conservative treatment was advised and the patient was treated at home for seven months with prostatic massage and vesical lavage, twice weekly, with one rest period of six weeks. He returned to the clinic at the end of this time; he had not obtained any relief

of the former symptoms and had 30 c.c. of residual urine.

A transurethral resection was done, and a small median bar was removed. The tissue which was removed weighed 2.5 gm. Pathologic examination revealed adenofibromatous hyperplasia. The patient was hospitalized for only four days. At the time of his dismissal from the clinic, he was voiding an adequate stream and the urine was crystal clear.

A response to a letter of inquiry stated that his stream is of very good size, flows freely, and that there is not any urinary urgency, frequency, or burning. There is not any nocturia.

Case 5.—A white man, aged forty-four years, for several months had been subject to urinary frequency and urgency, pain in the lower part of the back, nocturia which had caused him to void four to five times each night, and a gradual loss of strength.

Examination revealed 60 c.c. of residual urine. There was a prostatitis, grade 4, and rectal examination revealed that the prostate was normal in size. The voided urine contained leukocytes, grade 3.

Cystoscopic examination revealed chronic granular prostatic urethritis; a median bar, grade 1 to 1+; and an areal cystitis, grade 2. The urine, which was obtained by vesical catheterization, contained leukocytes, grade 3, and the culture revealed *Escherichia coli*. The urine, which was obtained by catheterization of the right ureter, revealed leukocytes, grade 1, and that which was obtained by catheterization of the left ureter revealed an occasional leukocyte. Culture of both specimens showed *Escherichia coli*.

Conservative treatment was instituted; this consisted of prostatic massage, vesical lavage, administration of a ketogenic diet, and acidification of the urine with ammonium chloride. This treatment was continued for seventeen days and the patient was much improved, but because of the persistence of 30 to 60 c.c. of residual urine, the infection could not be eradicated. A small median bar was removed by transurethral resection to eradicate the residual urine. The bar proved to be very fibrous and tough. The tissue which was resected weighed 2 gm. Pathologic examination disclosed adenofibromatous hypertrophy. The patient was hospitalized for only four days.

At his dismissal from the clinic, the patient was voiding freely, and did not have any residual urine or other symptoms of prostatic obstruction.

A response to a letter of inquiry stated that he has a very good stream, which flows freely. There is not any urinary burning, frequency, or urgency, and he has to void only two to three times at night.

Case 6.—A white man, aged fifty-nine years, had had a stricture of the urethra ever since he had had an attack of gonorrhea when he was sixteen years of age. Sounds had been passed repeatedly. He complained of a slow stream, urinary burning and urgency, and nocturia. His urethra was dilated with sounds, and the prostatitis, which was graded 4 was treated with massage and vesical irrigations. He improved as a result of a ketogenic diet, and was sent home.

Two years later he returned to the clinic and com-

plained of the same symptoms. Examination at this time revealed 30 to 60 c.c. of residual urine. There was a prostatitis, grade 4. The voided urine contained leukocytes, grade 2. Rectal examination revealed a hypertrophy of the prostate, grade 1.

Cystoscopic examination disclosed a stricture of the posterior urethra, and a median bar, grade 1+. The bladder was normal. The vesical urine, which was obtained by catheterization, revealed leukocytes, grade 2, and the culture disclosed *Escherichia coli*. The ureters were not catheterized.

Conservative treatment was again instituted; this consisted of dilatation of the stricture, prostatic massage, and bladder lavage, for ten days. However, the residual urine and the other symptoms persisted.

Therefore, transurethral resection of the small median bar was performed. The tissue which was removed weighed 2 gm. Pathologic examination revealed adenofibromatous hyperplasia. The period of hospitalization was four days.

At the time of his dismissal from the clinic, the patient was voiding freely, did not have any residual urine, and the other symptoms were entirely relieved.

A response to a letter of inquiry stated that the patient has a urinary stream of adequate size, which flows freely. There is not any burning or pain on urination, and he voids about four to five times during the day and about twice at night.

Case 7.—A white man, aged forty-six years, about two years ago, had had urinary frequency and urgency, marked nocturia, and some incontinence of urine. These symptoms gradually had responded somewhat to persistent prostatic massage. The last few months he had complained of few symptoms, except a slow stream. His physician had found 6 ounces of residual urine at different times.

Examination at the clinic revealed 200 c.c. of residual urine, and a prostatitis, grade 4. The voided urine contained leukocytes, grade 3. Rectal examination revealed prostatic hypertrophy, grade 1.

Cystoscopic examination disclosed chronic granular prostatic urethritis, grade 2, a small median bar or an odd type of sclerosis of the posterior half of the vesical neck, and a cystitis, grade 2+. The vesical urine which was obtained by catheterization revealed leukocytes, grade 2, and culture disclosed *Escherichia coli* and *Streptococcus fecalis*. Neither ureter was catheterized, but both were spurting clear urine.

Conservative treatment was advised; accordingly, prostatic massage, vesical lavage, and the ketogenic diet were tried for sixteen days, but 125 to 150 c.c. of residual urine persisted.

Because of the residual urine, a transurethral resection was performed and the sclerotic bar was removed. Bites were taken from the portion of vesical neck, which corresponds to that which is situated between three and nine o'clock on the dial of a clock. The tissue which was removed weighed 1.5 gm. Pathologic examination revealed an adenofibromatous hyperplasia. The period of hospitalization was five days.

When the patient left the clinic, the amount of

residual urine was between 40 and 50 c.c., but was gradually diminishing. The patient had an adequate stream. There was not any urinary frequency, but he had to void two to three times each night.

A response to a letter of inquiry (patient was operated on two months ago) states that the amount of residual urine is only 30 c.c., and seems to be diminishing gradually. There is not any urinary frequency or urgency, and there is not any burning on urination. His stream is adequate and he has to void only twice each night.

Case 8.—A white man, aged sixty-three years, had had a small stream, which was difficult to start and was interrupted. This had been present for five years. There had been dribbling at the end of micturition and the patient had felt that he did not empty his bladder. He also complained of frequency, and nocturia, which caused him to void three to four times each night. During the past four weeks the symptoms had increased greatly in severity.

Examination did not reveal any residual urine. There was a prostatitis, grade 4, and rectal examination revealed prostatic hypertrophy, grade 2. The voided urine revealed only an occasional leukocyte.

Cystoscopic examination disclosed chronic cicatricial prostatic urethritis, grade 2, prostatic fullness, grade 1, and a median bar, grade 1. The bladder was normal. The vesical urine, which was obtained by catheterization, was apparently normal, but the culture revealed *Streptococcus fecalis*. Neither ureter was catheterized.

Conservative treatment was carried out for twenty-five days. This consisted of prostatic massage, vesical lavage, and the intravenous administration of neoarsphenamine. There was not any improvement as a result of this treatment.

Transurethral resection was carried out at the end of this period, but the patient was informed beforehand that the results would be doubtful. Tissue which weighed 1.5 gm. was removed from the posterior vesical lip. Pathologic examination revealed adenofibromatous hypertrophy. The period of hospitalization was six days.

When the patient left the clinic, there was not any residual urine, and the symptoms were partially improved.

A response to a letter of inquiry stated that his stream is not good. It is still interrupted and there is some terminal dribbling. There is only a very little burning or discomfort on voiding and he voids seven to eight times during the day and two to three times at night.

Comment

The crux of the problem, therefore, is that when in doubt about the management of the

prostatic patient, conservative treatment should be tried first, and, if it does not give results, surgical intervention is indicated. It is not fair to the patient, however, to continue with ineffectual medical treatment for a long period of time. Surely, three to six weeks is sufficient trial. At the clinic, we recently operated on a man who was in his late forties. He had been incapacitated for a year because of severe prostatic symptoms that consisted of marked urinary frequency and urgency, nocturia, burning on urination, a slow urinary stream, and residual urine. Prostatic massage, which had been employed for one year, had not given any results. The latter six months of this period, he became so incapacitated that it was necessary for him to give up his position. Cystoscopic examination revealed a hypertrophy of the median lobe, grade 2+. Following transurethral resection, he was relieved completely and left the hospital on the fourth day. This case is cited to illustrate the unfairness to the patient of too long a period of conservative treatment, when it is proving ineffectual. On the other hand, it is just as much an error in judgment to submit a patient to resection of a small amount of tissue at the bladder neck if his symptoms are caused primarily by the inflammatory element, as is the case in the patient suffering from chronic cicatricial prostatic urethritis. In addition to not relieving the symptoms in such a case, they may occasionally be exaggerated and the infection of the vesical neck may become more difficult to treat than it was before.

We feel, therefore, that it is of primary importance to adhere to the rule laid down before, namely, "when in doubt, give conservative treatment a trial first." If the physician will follow this simple rule, surely he will be able to exercise good sound judgment and to care for prostatic patients in a modern, up-to-date manner.

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THE SPECIAL OPERATIVE TECHNIC IN CERTAIN TYPES OF PROSTATIC DISEASE*

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THE recent progress made in the treatment of prostatic disease has brought relief to a class of individuals who would otherwise continue to endure a life of misery or prematurely succumb to the complications of prostatic obstruction. The improved methods in handling these cases have been brought about mainly by recognizing all the problems present in each individual case and treating or relieving these associated complications as well as the primary disease itself.

No doubt the simple method employed today to relieve obstruction by the resectoscope has done much to prevent the serious consequences of an obstructing bar or lobe left untreated. Preliminary treatment, however, has contributed much in coping with this disease and has encouraged patients to seek relief earlier, thereby preventing many complications that would otherwise ultimately manifest themselves.

The mortality rate in the transurethral resection operation, as given by the urologists, is extremely low; but, when one considers the greater number of patients who are now seeking and accepting treatment by this method and many of them in a much earlier stage of the disease than formerly, the mortality rate should, in consequence, be very low. However, if some of these patients would have the enucleation operation performed, the results would be more gratifying as they would be rid of the whole of their local trouble and, perhaps, would not have to have a second or third resection.

Our added knowledge gained from past experiences and the recognized necessity of employing preliminary treatment of all disabling complications before any operative treatment is undertaken, has brought about better results.

Kretschmer⁶ reports 40 per cent of cardiac disease in 300 unselected prostatic cases and states many of these can have a suprapubic enucleation in one stage, safely, and others after preliminary cystostomy. It has been shown that, when proper drainage is established, many dependent afflic-

tions, such as hypertension, gastrointestinal and heart trouble, improve, thereby permitting an operative cure of the prostatic disease.

As to the cause of enlarged prostate, C. H. Mayo⁷ advances the theory that it might be the penalty of civilization; retaining too long a large amount of urine in the bladder, or the inability under our present social status to empty the bladder when urgency arises. The theory of endocrine imbalance is unlikely.

The types of this enlargement are varied. The intravesical form sometimes is very large. It may completely surround and greatly lengthen this portion of the urethra. The subvesical type, situated below the internal sphincter, may cause atrophy of the normal prostatic tissue and, when very large, seemingly displace that organ.

The surface of the growth may be smooth or irregular and frequently, within the mass, nodules of varying sizes are found with connective tissue septa. When carcinoma is present, small, firm masses and an apparent thickened urethral wall are observed. Cystic areas may contain fluid and, occasionally, pus. The acute enlargement with obstruction may be due to an over-distended bladder, with swelling, inflammation and infection calling for instrumentation. This should, in the beginning, be recognized as a non-operative case and treated as such.

Deming² and his co-workers state that hypertrophy of the prostate has been the subject of endless dispute as to whether it is a hyperplastic process or a true neoplasm.

F. Reischaur⁸ states: "The relationship to myomata of the uterus becomes more evident if the proliferation of the stroma is considered the cause of prostatic hypertrophy." If such is the case, it would be as unreasonable to remove a part of such a growth, in a prostate, as it would be to remove part of a uterine myoma.

Gronn and Mikkelsen⁴ state: "The possibility of a carcinoma developing in an adenoma must be borne in mind in every case of prostatic hypertrophy and the prognosis for a clinically undemonstrable carcinoma in an adenoma is relatively good on enucleation."

*Read at the annual meeting of the Southern Minnesota Medical Society, at Austin, Minnesota, August 26, 1935.

Geraghty³ has said that: "In 75 per cent of carcinoma, an adenoma preceded this development or hypertrophy was associated with it." The second type of carcinoma originates in the adenoma and cannot be diagnosed until a careful histological examination is made of the removed growth.

The frequency with which carcinoma has been found in the prostate varies from 20 per cent according to Young, 13 per cent according to Judd, and 10 per cent according to Guckerken-dall.

The methods of examining the prostate and the condition of the whole urinary tract have so improved in recent years, that there is little excuse for overlooking complications. The surgeon is now able to learn the size, shape and consistency of the obstruction or growth, and the condition of the bladder and ureters. Rectal examination, however, still remains one of the most important methods of determining the size and consistency and location of the tumor. Often, cancer can be suspected from this examination alone.

By intravenous urography and other uses of the x-ray, the cystoscope, chemical analysis of the urine and blood, and by thorough physical examination, one should determine the function of the kidneys, the amount of residual urine, the presence of albumin, casts, pus, or blood or any other abnormal constituent of the urine.

A urethritis, cystitis, pyelitis, or pyonephrosis, as well as diverticula or stones, should be recognized. An abscess, cancer or tuberculosis also can usually be discovered.

Herbert Williams¹⁰ would do a suprapubic operation on cases with marked enlargement and prominent bulging into the rectum. Gilbert Thomas⁹ believes that, in selected cases, prostatectomy and transurethral resection are about on a par when done by competent surgeons.

In carcinoma of the bladder, Hymen⁵ prefers open operation and resects the proliferating part with the endotherm needle, coagulates the base and plants radium seeds in the remaining diseased area.

Alcock¹ believes that the family physician will note the final comparative results of resections and prostatectomies and will be the deciding factor in determining which method will be employed in each individual case.

The majority of prostatic cases will, possibly,

be treated by the general practitioner and operated by the general surgeon; and inasmuch as few general surgeons can successfully use the resectoscope, we must find a way so that it will be possible for them to get results that will compare favorably with those of the urologist.

If the surgeon will: (1) carefully examine and select his cases; (2) follow a thorough preliminary and postoperative form of treatment; (3) become familiar with the modern methods of treating these cases; and (4) is well trained and equipped to rapidly and skillfully operate, his results will be satisfactory. The serious cases and those definitely requiring the removal of a bar or small obstructing lobe by the resectoscope should be referred, if possible, to one equipped and experienced in this line of work. The method of attack for relief will depend upon the judgment, experience, ability and qualifications of the surgeon and the condition of the patient, when operation is decided upon.

In the presence of infection when the indwelling catheter is not tolerated, a two-stage operation may be indicated. A preliminary cystostomy should be performed, after which marked improvement may occur. These patients should be out of bed shortly after this procedure, however, and the prostate removed when the patient is in a satisfactory condition.

It would seem advisable to use the suprapubic method of attacking growths of the prostate in the presence of:

1. Large intravesical tumors of the prostate.
2. Other large tumors situated below the bladder.
3. Irregular tumors which may contain cancerous nodules.
4. Difficulty in the passage of the resectoscope.
5. An abscess or the possibility of an abscess.

The objects to be accomplished by the operation are:

1. To prevent oncoming obstruction.
2. To overcome obstruction.
3. To restore the function of the bladder.
4. To relieve back pressure on the kidneys and prevent hydronephrosis.
5. To establish free drainage and prevent or overcome infection.

Most suitable prostatic cases can have a suprapubic operation performed under local anes-

thesia. Personally, I prefer spinal or caudal anesthesia with novocain.

The patient is previously given a large amount of water and, if desirable, intravenous glucose or calcium chloride. A moderate sized catheter is placed in the bladder. The bladder is flushed out and, having been previously tested for capacity, is filled with the amount of boric acid solution necessary for that purpose. After the usual suprapubic skin incision, the bladder is then opened with a trochar and suction used. After enlarging the opening, retractors bring the prostate into view. These may be armed with electric bulbs or separate intravesical lights may be used for clear vision. An assistant, with two fingers in the rectum, steadies and raises the prostate. A curved incision at the tip of the prostatic growth opens the mucous membrane of the bladder and a mucous flap is dissected from the growth. The tumor is dissected out rapidly with the fingers. The counter-pressure of the assistant's fingers on the prostate facilitates the dissection and makes it possible to identify any remaining nodules. If the growth is badly adherent and can not be removed easily, it may be scooped out with the electro-surgical wire loop.

The wound is kept free from blood by suction. Tags are thoroughly removed. Bleeding vessels are ligated. Additional bleeding points may be coagulated with the electric current or any interureteral obstructing bar can be removed by the electro-cautery knife without bleeding. The prostatic flap is stitched down to obliterate the prostate space.

The catheter tip is transfixed with a needle and a suture of silk, which is brought out through the suprapubic drainage wound along the tube, which is about one-third of an inch in diameter.

The proper location of the catheter is maintained by the suture affixed along the suprapubic drainage tube. This method of retaining the catheter is most satisfactory to the patient. The bladder is thoroughly and carefully closed around the suprapubic drainage tube, which is placed high in the fundus of the bladder. A purse-string suture of catgut is placed around the tube in the fundus of the bladder; this can be twisted when the tube is removed, thereby helping to close the bladder opening and lessening the period of convalescence.

In case carcinoma is suspected in the prostatic

area, the masses can be removed by the electro-surgical loop and the base cauterized or radium seeds can be placed therein.

The bladder is washed through catheter and drainage tube alternately to thoroughly remove blood and clots from the bladder, and frequent irrigations carried out thereafter until bleeding ceases.

The patient is usually given intravenous glucose for two or three days following the operation, large quantities of water, and a bland simple diet. The suprapubic tube is removed as soon as feasible. Occasionally this tube can be omitted where bleeding is not likely and the bladder sewed up tight, but frequent irrigations must then be carried out to prevent any clots from blocking the catheter. If, at any time, drainage from the catheter or suprapubic drainage tube ceases, they are immediately opened up by an irrigating stream.

A rectal tube is used, occasionally, to prevent gas pressure. In the usual case, the patient is propped up in bed directly following the operation and out of bed in most cases in three to seven days, if the bleeding has stopped. I am convinced that patients have been kept in bed much longer than necessary after these operations, which, no doubt, has been detrimental and increased the postoperative complications and the mortality rate. They should be encouraged to sit up as soon as possible.

Advantages of the suprapubic method, in certain cases, are:

1. Large tumors are thoroughly and quickly removed.
2. Second surgical interference is usually avoided.
3. Adherent portions may be quickly removed by the electro-cautery under direct vision.
4. Unsuspected carcinomata may be removed thoroughly by this method.
5. Patients are less likely to have infection.

Conclusion

In selected cases, suprapubic removal of the enlarged troublesome prostates should be the method of treatment.

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DISEASES OF THE PITUITARY BODY AMENABLE TO SURGERY*

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IN 1885 Pierre Marie, while working at the Salpêtrière in Paris, reported two cases that he had observed in the great Charcot's Clinic. The outstanding and characteristic findings in these two cases, which suggested the name "acromegaly" for the new disease, were enlarged hands and feet and a deformed head with an abnormally prominent lower jaw. Thus the name "acromegaly," coming from two Greek words meaning "extremity" and "large," was applied to the entity. Marie did not know the cause of this transformation. He merely described the condition as an unusual, noncongenital hypertrophy of the head and upper and lower extremities. The next year (1886) Marie¹¹ described changes in the pituitary body in cases of acromegaly. The following year (1887) Minkowski described in more detail the relationship of disorders of the pituitary to acromegaly. Since then a voluminous literature has accumulated on the diseases of the pituitary. In 1894 Oliver and Schäfer were the first to demonstrate a function of the pituitary body when they noted a rise of blood pressure and a fall of pulse following injection of extracts made from the entire pituitary.

Fröhlich, in 1901, described a case of tumor of the hypophysis cerebri without acromegaly. In fact, there was arrested development, particularly of the organs of generation. This case represented deficient function of the pituitary, or a state of hypopituitarism, as contrasted with the hyperpituitarism of acromegaly.

Many notable contributions on the subject of disorders of the pituitary have been made, and for those particularly interested in the subject I would suggest perusal of works by Cushing

(1912) and by Bell (1919), and reading of The Harvey Lectures of 1933 by Cushing.

In February, 1893, seven years after the relationship of acromegaly to tumor of the pituitary had been suggested, a surgeon was bold enough to operate for relief of the intractable headache in a case of acromegaly. Paul, in Liverpool, undertook the operation but he never reached the pituitary tumor. He merely performed subtemporal decompression but in so doing relieved the headaches and the patient survived for three months. Later Horsley, who had suggested the temporal approach to the pituitary because of his experience with operations on animals, utilized this experience in attacking diseases of the pituitary in the human subject. Krause probably was the first to employ successfully the transcranial approach to the pituitary and in many respects his operative removal of a sarcoma of the pituitary compares favorably with the technic employed today in removal of pituitary tumors.

The treatment of diseases of the pituitary cannot, with justification, be divided into management of those cases which are to be treated medically and those which are to be handled surgically. In many cases it is a combination of treatments or methods that offers the patient the maximal amount of relief from his disease. For instance, a combination of radiotherapy, surgery and organotherapy may be needed for the proper handling of a particular case. But since I am supposed to limit myself to surgery I shall not discuss the applicability of roentgen and glandular therapy for pituitary lesions.

Tumors of the pituitary body proper and the expanding intracranial lesions which by their secondary pressure-effects on the pituitary cause pituitary dysfunction, are amenable to surgery.

Tumors of the pituitary, next to gliomas, are

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the most frequently encountered intracranial neoplasms and constitute about 20 per cent of all intracranial tumors.⁵ Their presence is easily detected and their surgical removal gives excellent results.

Although there are many different kinds of pituitary tumors, about 90 per cent⁶ of them are adenomas, chromophobe, eosinophilic and basophilic in type. About 20 per cent¹⁶ of the adenomas are cystic. The less frequently encountered pituitary tumors are the Rathke pouch tumors, or, according to Frazier, Rathke cleft tumors, and the hypophyseal duct tumors. Glioma and sarcoma of the pituitary are also known to occur. Rathke cleft tumors and the duct tumors are congenital neoplasms arising from embryologic rests and usually develop in childhood. They usually are cystic and practically always are situated above the sella turcica, although they may lie within the sella.

Diagnosis of Pituitary Tumors

The diagnosis of pituitary tumors depends on detection of two or more of the following findings: (1) endocrine imbalance (hyperpituitarism or hypopituitarism), (2) visual disturbance, and (3) roentgenographic evidence of abnormality either within or above the sella turcica.

True acromegaly is pathognomonic of a pituitary adenoma. In addition to the enlarged extremities, prominent lower jaw, and the sexual disturbance, there is practically always roentgenographic evidence of enlargement of the sella turcica. Later, also, visual disturbances may be noted but these are not as common as in the presence of other tumors of the pituitary body. The reason for this is that the eosinophilic adenoma of acromegaly tends to enlarge the sella downward and thus to decompress itself in the sphenoid air sinus.

Visual disturbance, with inability or decreased ability to see to either side, that is, in the temporal field of vision, is the hallmark of interference with the visual pathways in the region of the optic chiasm. The lesion which most frequently produces this bitemporal hemianopsia is the pituitary tumor. The demonstration of bitemporal blindness, in association with an enlarged and eroded sella turcica, is sufficient evidence to warrant a provisional diagnosis of pituitary tumor, and surgical exploration usually will confirm this diagnosis.

Roentgenograms of the skull, showing the sella turcica, are most helpful in the diagnosis of pituitary lesions. Intraseellar adenomas cause expansion of the sella, with erosion of the floor and clinoid processes. The congenital tumors of the pituitary usually are recognized by the presence of flakes of calcium, shadows of which are easily demonstrated on the roentgenograms. These deposits of calcium usually appear above the sella turcica and may or may not be associated with enlargement and erosion of the sella. At times the entire extent of the tumor may be visualized on the roentgenographic film because, in the wall of the tumor, calcification takes place and appears as a more or less continuous shadow (see Case 2). Of course, when the tumor is situated above the sella, the chiasm or optic tracts are encroached on and a field defect results. Then, too, in the presence of congenital suprasellar cysts, frequently there is evidence of pituitary dysfunction such as failure of growth, lack of development of sexual characteristics, and abnormalities of the skin.

If the presence of a tumor is not determined, and adequate treatment is not provided, the lesion will continue to grow, will overflow the sella turcica, and then evidence of increased intracranial pressure will appear, together with "neighborhood" symptoms. The findings then would be those of any suprasellar intracranial tumor. If the tumor grows upward to involve the third ventricle, internal hydrocephalus develops, with consequent severe headaches, nausea and vomiting. The optic disks become edematous and secondary optic atrophy will supervene unless the pressure is relieved. There may be also torpor, disturbance of regulation of temperature, and diabetes insipidus from involvement of the hypothalamus. If the lesion extends laterally, ocular palsy may occur from pressure on the third, fourth, and sixth cranial nerves, which are nearby. Severe facial pain may occur from involvement of the gasserian ganglion.² This pain may be mistaken for trigeminal neuralgia. A complete examination, however, will clear up the diagnosis. If the lesion extends more laterally, into the middle cranial fossa, visual and auditory hallucinations or uncinat fits may result from irritation of the temporal lobe. If the lesion extends back-

ward into the interpeduncular space, bilateral involvement of the pyramidal tract will occur, as exemplified by the presence of bilateral Babinski reflexes.

practical application, I have reviewed some of the cases that have been under our care at the clinic and shall present a résumé of the records of three or four of these cases.

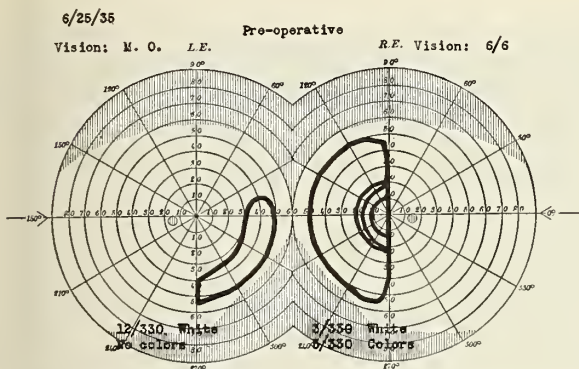


Fig. 1. Case 1. Chart of visual fields made before removal of pituitary tumor. M. O. means moving objects.



Fig. 2. Case 1. Lateral roentgenogram of the skull, giving evidence of enlarged and eroded sella turcica.

Indications for Operation

In the case of pituitary tumors, operation is indicated (1) to preserve vision and (2) to relieve headache. When the tumor has extended beyond the limits of the region of the sella turcica and has given rise to symptoms and signs of increased intracranial pressure, surgical operation is necessary, although undertaken at great risk to preserve life.

Report of Cases

In order to emphasize some of the points made so far, and to give the discussion a more

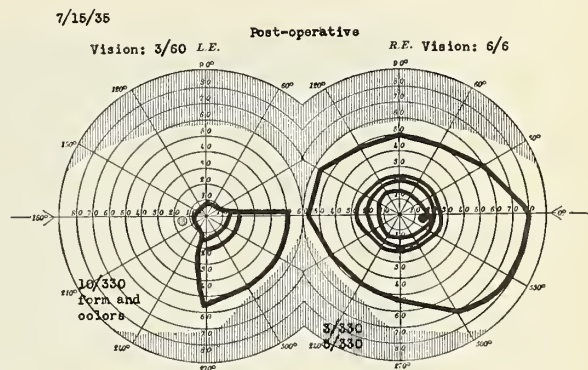


Fig. 3. Case 1. Chart of visual fields made sixteen days following operative removal of pituitary tumor.

Case 1.—Chromophobe adenoma of pituitary. Successful removal.—A white man, of thirty-six years, came to the clinic in June of this year with a complaint of blurring vision of six months' duration. He stated that when his vision had been blurred for three weeks he had consulted his local eye doctor, who had discovered bitemporal hemianopsia. Roentgenograms of the head had disclosed an enlarged sella turcica. Roentgen therapy to the pituitary region had been given without improvement in vision. His vision was failing gradually. At the time we first saw him, he complained of being practically blind in the left eye. In addition to the visual disturbance he complained of loss of libido and potentia. Otherwise he considered himself in good condition.

On examination his blood pressure, pulse and temperature were normal. General physical examination revealed no abnormalities. His basal metabolic rate was -23 . Examination of the eyes revealed visual acuity of 6/6 on the right and ability to detect moving objects on the left (Fig. 1). There was pallor of the left optic disk. Plotting of the perimetric fields revealed bitemporal hemianopsia. Roentgenograms of the skull gave evidence of erosion of the floor and clinoid processes of the sella turcica (Fig. 2). A diagnosis of pituitary tumor was made, left transfrontal craniotomy was performed, and a large chromophobe adenoma of the pituitary was removed. Convalescence was uneventful. Examination of perimetric fields, sixteen days following operation, revealed marked improvement in vision. Visual acuity was 6/6 on the right and 3/60 on the left (Fig. 3).

Case 2.—Suprasellar cyst; Rathke pouch (or cleft) cyst. Successful removal.—In April of this year, a girl of five years was referred to the clinic for treatment for a brain tumor, because at home roentgenograms of the head had disclosed a large, suprasellar, calcified lesion. The referring physician had been

consulted because of a squinting right eye and very poor vision. Except for mention of slight clumsiness and inability to hop on one foot, no other complaints were made. There had been no headache, vomiting or convulsions.

four days later, at which time neurologic examination gave negative results, the right strabismus had improved considerably, and she stated that she could see much better (Fig. 5). Objectively the vision was now 6/12 on the left, with temporal hemianopsia, and



Fig. 4. Case 2 (left). Lateral roentgenogram of the skull giving evidence of calcification in the wall of a suprasellar cyst, also enlargement and erosion of the sella turcica and convolutional atrophy of the skull.

Fig. 5. Case 2 (right). Appearance of patient sixteen days following removal of suprasellar cyst. The right transfrontal wound is well healed.

The girl was well developed, bright, and coöperative. Her blood pressure, pulse and temperature were within the limits of normal. Examination of the eyes revealed ability to perceive only light with the right eye. With the left eye the girl was able to count fingers in the nasal field of vision only. Pupils and reflexes were normal. There was a convergent strabismus on the right. Examination of the ocular fundi disclosed primary optic atrophy, which was more marked on the right. Neurologic examination gave normal results except for the visual findings and an inability to hop on one foot.

Roentgenograms of the head disclosed a very large (5 cm.) calcified tumor just above and anterior to the sella turcica. There was secondary enlargement and erosion of the sella turcica. In addition, there was convolutional atrophy of the skull, indicative of internal hydrocephalus (Fig. 4).

A diagnosis of suprasellar cyst was made and after the great risk of operation had been explained to the mother, right transfrontal craniotomy was performed and a very large suprasellar cystic tumor was uncovered when the right frontal lobe was elevated. To secure adequate exposure, the right lateral ventricle was tapped and the ventricular fluid removed, thus allowing the brain to collapse partially. Four ounces (120 c.c.) of rather dark fluid were aspirated from the tumor and then the collapsed cyst-wall, containing a large amount of calcium, was removed. Postoperative convalescence was uneventful and the patient was dismissed from the hospital fourteen days following operation. She was released from our care

the girl was able to detect moving objects with the right eye.

Case 3.—Hypophyseal duct tumor. Successful removal.—In July of this year, a male patient of twenty-six years (it is difficult to know what to call this patient for he was neither man nor boy) came to the clinic with a history of blindness of the left eye of two years' duration. The failure of vision had been gradual and had gone on to completeness on the left, and for the past six weeks he had noticed that he bumped into objects on his right, thus indicating that the right eye was failing. For one and a half or two years, in addition to the visual difficulties, he had experienced transient episodes of smelling something that was nonexistent. These experiences (uncinate fits) were followed by a sense of unreality and confusion.

The past history in this patient's case was interesting. At the age of six or seven years he had had severe headaches which had necessitated his leaving school. His gait on these occasions had been unsteady. There had been no headaches since the age of seven years. He had weighed twelve pounds at birth and had developed normally until the age of twelve years. There had been no growth between the ages of twelve and twenty-one years. During the past five years he had grown four inches (10 cm.) in height. Studying was an effort for him and his grades in school had always been poor. His voice never had changed.

Examination revealed a blood pressure of 84 mm. of mercury systolic and 62 diastolic, which was lower than the average normal. His pulse and temperature were

normal. The patient's voice was high pitched, his appearance more feminine than masculine. His trunk was short, his arms and legs long, and his fingers long and tapering. The skin was white, fine, smooth and hairless. The hips were broad, the shoulders nar-

had undergone complete cystic degeneration. When all of the content had been evacuated, the cyst-wall was gently dissected from the optic nerves and chiasm and removed. Convalescence was uneventful and the patient was dismissed from the hospital on the tenth day following operation; he was released from our care two days later, at which time neurologic examination gave results that were unchanged. There was no demonstrable change in the visual field, but the patient stated that he could see better and there was questionable perception of light on the left, where complete amaurosis had been present prior to removal of the tumor (Fig. 7).

Case 4.—Suprasellar and intrasellar cyst with negative roentgenograms. Successful removal.—A girl first came to the clinic when she was eleven years of age. At that time we obtained a history of influenza at the age of five years. Following this illness she had failed to gain in weight, and she never had been strong and active. At the age of eight years she had had measles, after which she had suffered from excessive thirst and excessive urination. She would drink two to three quarts of water in the course of the night, and would pass large quantities of urine; she would have to get up two or three times a night.

Examination of the eyes gave normal results. Roentgenograms gave evidence of a normal skull, with a small sella turcica. Pituitrin in a dose of 3 minims, given hypodermically, daily was sufficient to control the diabetes insipidus. (Urinalysis was negative for sugar.)

At the age of nineteen years this patient returned to the clinic because of the recent development of severe headaches associated with nausea and vomiting. Although her diabetes insipidus had been controlled with pituitrin she had failed to develop and she had menstruated only twice. One month prior to admission she had noticed for the first time that when she covered her left eye she could see only light from her right.

Physical examination revealed a markedly underdeveloped girl. She was small of stature and her sexual organs were infantile. Her basal metabolic rate was -12 .

Examination of the eyes disclosed bitemporal hemianopsia with primary optic atrophy on the right. Neurologic examination gave normal results, except for the ocular findings. Roentgenograms of the skull were negative. Roentgenograms of the hands gave evidence of normal centers of ossification.

A diagnosis of pituitary tumor was made and Dr. Adson performed a right transfrontal craniotomy, with removal of a cystic tumor of the pituitary body. The tumor was situated for the most part above the sella turcica, but it extended into the sella as well. Convalescence was uneventful.

This patient returned two years later because of convulsive seizures of a grand mal type. She had gained some in stature and weight. There had been no progression in visual changes subjectively, and this was confirmed by determination of perimetric fields.



Fig. 6. Case 3 (left). General appearance of patient before operation.

Fig. 7. Case 3 (right). Appearance of patient ten days after removal of pituitary tumor. The left transfrontal wound is well healed. Pigmentation of the skin of the face is common in hypopituitarism.

row, and fat pads were present over the symphysis pubis and the greater trochanters. The genitalia were rudimentary (those of a ten or twelve year old boy) and the prostate gland was undeveloped (Fig. 6).

Examination of the eyes disclosed complete blindness of the left. Vision of the right eye was $6/5$, with complete temporal hemianopsia. Examination of the fundi revealed bilateral, primary, optic atrophy; the change was greater on the left than on the right.

Neurologic examination disclosed marked diminution of all tendon reflexes and a positive Babinski sign on the right. Roentgenograms of the skull disclosed that the sella turcica was greatly enlarged, with destruction of its floor and erosion of the posterior clinoid processes and dorsum sellæ.

A diagnosis of a large tumor, extending within and above the sella turcica, was made and left transfrontal craniotomy was performed for its removal. When the left frontal lobe was elevated, a large, cystic tumor of the pituitary gland was encountered. The tumor filled the sella turcica and extended anterior to, and above, the optic chiasm, which was displaced posteriorly. When the capsule of the tumor was incised, a large quantity of dark brown, grumous material, with crystals of cholesterol, escaped with a gush. The tumor

Neurologic examination gave normal results. This latest development, convulsions, is merely another manifestation of the glandular imbalance, dyspituitarism, and is not attributable to any postoperative change or to any localized cerebral lesion.

Conclusion

During this short discussion I hope I have been able to bring out some of the more important facts regarding tumors of the pituitary body. Although the normal pituitary is an extremely small organ, it may assume rather large proportions, and in so doing may completely alter the appearance, development, and life of the individual. For a long time this organ was considered inaccessible, and, even though a diagnosis of pituitary tumor could be made, surgeons were loath to attempt surgical extirpation. A recital of the foregoing cases should, I think, convince one of the beneficial effects which can be derived from surgical operation on this organ. With earlier recognition of lesions of the pituitary the results of surgical operation will improve, for if these patients can be operated on early, when the hemianopsia is incomplete, full restoration of vision can occur. When these patients are seen late in the disease we have to satisfy ourselves with preservation of the remaining vision.

With the present studies of endocrinology we may hope for a better day, when many diseases

of the pituitary may be prevented or even cured by administration of some extract made either from this or from some one of the other glands of internal secretion. Until that time arrives, early diagnosis and early surgical treatment offer the patient who harbors a pituitary tumor the best chance for preservation of vision and avoidance of irreversible changes in the body and irremediable damage to the brain.

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OBSTETRICS IN GENERAL PRACTICE*

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MY part in this symposium is based on experience in general practice and will deal especially with certain features in the management of the difficult cases which we all have every year. I shall not attempt to discuss all the unusual presentations of which we may have only one or two in a lifetime.

We do not always obtain as much help as we would like from the textbooks on obstetrics, for these books are written by men carrying on an obstetrical practice in large and specially equipped hospitals, and, under the conditions met in general practice, the help and the facilities are

usually lacking to carry out in detail the procedures recommended. We are thrown upon our own resources and must do the best we can under the circumstances.

Every year we all have a number of cases where the baby has been born before we arrive, or is born shortly after we get there. These are usually the source of no trouble, for, while there has been no aseptic technic, there also have been no examinations and no meddlesome interference. About all that is left to do is to deliver the placenta and search for any tears that need to be repaired. While it is somewhat like putting the cart before the horse to discuss the delivery of the placenta at this point, it is in just this type

*Read before the meeting of the Southern Minnesota Medical Association, Austin, Minnesota, August 26, 1935.

of case that we occasionally have trouble. If the placenta does not come away easily in twenty or thirty minutes we try to express it by the Credé method and this is usually successful. Occasionally, however, the placenta is adherent and we are likely to find ourselves attempting to loosen it in the cervix with the gloved hand in these patients who have not been properly cleansed and prepared beforehand. One may find it necessary to go higher and higher in the uterus to get the placenta entirely free and I think we should make it a rule to wait a few hours if necessary for the placenta to come away by external manipulation and if we must invade the uterus at all for manual delivery to first have the patient as thoroughly cleansed as possible, and then, under an anesthetic, be prepared to go as high as need be to complete the delivery. It is not a simple procedure and is fraught with danger of sepsis.

We come next to the average or moderately severe cases, usually primiparæ, in which the pains are fairly severe but dilatation is slow. The occiput is probably anterior or we may suspect an occiput posterior which is slowly rotating to the front.

The young husband, who a few hours before was blithely expectant that the baby would be here after the third pain, is now pacing the floor and saying, "Doctor, for God's sake can't you do something?" The grandmother is telling us for the fifteenth time what old Doc Snatchem did under exactly similar circumstances when her boy Johnnie was born. The doctor is distinctly on the spot. What to do under the circumstances? We are likely to be goaded into starting something against our better judgment. Under these circumstances I can recall no case where I have been sorry for waiting but I can recall several times when I have been sorry for starting something too soon. I think the thing to do is to give the patient what relief we can with three to six grains of sodium amytal, followed, especially if she becomes somewhat unmanageable, by 1/6 or 1/4 grain of morphine, which seems to overcome the occasional exciting effect of the sodium amytal. We are told that the doctor's place at this time is by the patient's side, but if she is in a hospital or if someone with some experience is available to watch her I think the patient's best interests are often served by the doctor disappearing for a while so he will not be worn out by waiting and where he will not be tempted to

start interference too soon. Dilatation of the cervix is the *sine qua non* for anything the doctor may do and I can recall no case in several hundred where it did not finally occur. Thynturin is advised in these cases and I have sometimes used it with apparent good results in hurrying dilatation but in this case everything must be ready for an anesthetic for it often excites intense contractions, as hard or harder than we see with pituitary extract. I do not believe it should be used often outside of a hospital.

After dilatation is complete and the head makes some progress downward there is often an apparent arrest of progress though the pains are hard and the patient is becoming somewhat exhausted. The baby's heart tones are good or there may be some indication of fetal distress. We must use our judgment as to when to interfere and if the case is in the average home it is usually best to leave the patient alone. If she is in a hospital I think we should not be as reluctant as we often are to help her with the forceps. Granting that the head is in the occiput anterior position, with the patient under deep anesthesia we should take plenty of time to iron out the perineum. We do not always do this as thoroughly as we might and I think it is very important. Then with low or median forceps and episiotomy if necessary, and it is usually necessary in a primipara, I think we may often save the patient a lot of agony with little or no added danger to the mother or child. After all, the doctor is engaged to render some help in the case and when the time comes that he can safely do so I feel that he should not be too alarmed by the danger of low forceps.

But supposing we know it to be, or find it to be, a persistent occiput-posterior. Anyone who has tried to deliver an occiput-posterior by forceps knows how difficult or impossible it is, and this position is generally given as a contraindication to the use of forceps, though it is occasionally done. If there were no occiput-posteriors the lives of general practitioners doing obstetrics would be much easier. What is the best way to deliver an occiput posterior? I have seen many articles written on the subject but after reading them I have usually felt like Omar Khayyam in the *Rubaiyat*:

"Myself when young did eagerly frequent
Doctor and saint, and heard great argument
About it and about: but evermore
Came out by the same door as in I went."

In other words I have still been uncertain about the matter because so often the technic described has been something difficult to carry out in general practice. The only thing I ever learned about the Scanzoni maneuver was not to do it on account of the danger of injury to mother and child. There are various types of special forceps for rotating the head with which I am not familiar but which are probably efficient in the hands of men skilled in their use. For some time I thought version was the best procedure and I still think it is a good one if the case has not progressed too far and the waters have not broken so that one may make a small hole in the bag of waters and enter the hand quickly so that the version can be done while there is plenty of water in which to turn the baby. But unfortunately the waters have often been broken for hours when we get to the stage of active interference and version may then be a formidable procedure. It can nearly always be done though, even if the waters have been broken for hours, if the patient is thoroughly asleep under ether and if the doctor carefully works down a leg so that he can really get hold of an ankle to pull on while someone else renders some assistance suprapubically in pushing upward gently on the head. I know of no place in the practice of medicine where it is more necessary for the doctor to keep his head and not get excited and hurried. I think now that in persistent occiput-posterior positions, manual rotation of the head with application of the forceps in the anterior position is the answer when it can be done. The difficulty is usually not in turning the head but in holding it there while the forceps are applied, for when the turning hand is removed the torsion of the neck causes the head to return to its former position. I have found it to be a great help to have someone push steadily downward over the suprapubic region with one hand sunk deeply along each side of the baby's head before the operator removes his hand and while he is applying the forceps. This helps greatly in keeping the head from rotating to its former position. If it is not possible to rotate the head sufficiently it may be necessary to reach somewhat higher and attempt to rotate the shoulders also. If this is successful, there will usually be no trouble about then rotating and fixing the head. There is some danger of prolapse of the cord in such a case but I think this

will not often occur. If it does and cannot be replaced, or if there is failure in the attempt to rotate the head, there seems to be nothing left to do but version.

In regard to version, or in breech delivery, the baby is most often lost due to difficulty in delivering the after-coming head, and the trouble is not so much in delivery of the head itself as it is in delivery of the shoulders and arms, which may become extended above the head. If the arms and shoulders are delivered quickly enough there need not be so much hurry about the head for the body of the baby can be extended upward and the mouth wiped out so breathing can occur. Formerly I often had difficulty with the arms and shoulders, but since carefully studying Potter's book on version and following his method the difficulties have been greatly lessened. In Potter's method, as the body is born it is turned so as to bring one shoulder directly under the symphysis pubis and this shoulder is delivered first by depressing the body of the baby sharply over the end of the table so that the upper shoulder shells out under the symphysis first and usually the arm comes down without any trouble. The baby is then rotated 180 degrees, so as to bring the other shoulder to the top and down under the symphysis in the same way. The body is then lifted upward, pressure being made suprapubically if necessary, and the mouth made available for breathing by depressing the perineum, in which case there need be no great haste in delivering the head.

In regard to cesarean section, I can only say that it would seem to be not often necessary. In a series of about 700 cases I have seen only one where I felt it was definitely indicated and in which it was done. In this series, including the average small number of late toxemias of pregnancy, there was one maternal death and this was not the type of case where there was any indication for cesarean section. Some babies may have been lost that would have been saved by section but I believe the maternal mortality would have been greater had it been done very often. I have recently known of a case of cesarean section in which the baby died three or four days later of what was called cerebral hemorrhage, and if this is so, it would seem that section will not necessarily prevent that.

There are many other phases of obstetrics in general practice but in summarizing those phases

presented in this paper, I would stress the following:

1. Patience to wait for dilatation of the cervix, giving the patient in the meantime what relief is possible from analgesics such as sodium amytal and morphine in moderate amounts. After dilatation most cases will deliver normally.

2. Courage to assist the patient who needs it when the suitable time comes with whatever anesthesia is available and by low forceps, manual

rotation of the head and forceps, or version when these procedures seem indicated and when progress has been made to a point where they can be safely done. I am referring here to the long drawn out difficult cases.

3. The avoidance of efforts to deliver the placenta manually until one is thoroughly prepared to go as far as need be, which may be to the very top of the fundus of the uterus.

CASE REPORTS

PERINEAL PROSTATOTOMY FOR STONE: REPORT OF FOUR CASES*

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and

NORMAN W. THIESSEN, M.D.

Rochester, Minnesota

PROSTATIC calculi are usually the result of infection, and symptoms accompanying their presence are mainly attributable to predisposing infection unless the stone or stones have produced urinary obstruction. In most cases, the best treatment is by transurethral methods. Thompson and Cook reported sixty-seven cases of chronic prostatic abscess, in seven of which there were complicating stones; 90 per cent of the patients were satisfied with results obtained by transurethral methods of treatment. Prostatotomy or prostatectomy, however, will have to be done under certain conditions: when a stone has so far obstructed the urethra that passage of a cystoscope is impossible, when the stone is too large to be removed by the transurethral route, or when the symptoms cannot be ameliorated by prostatic massage and other medical measures. Any accompanying hypertrophy of the prostate gland can be treated by transurethral resection. If the stone is attributable to infection, its removal makes adequate treatment of the infection more possible.

Judd and Crenshaw have reported twelve cases of prostatic calculus in which operation was by various methods and results were good. We recently reported a case of prostatic calculus in which the importance of surgical interference was stressed.

The following four cases are presented to illustrate the operative indications and the importance of controlling the predisposing and accompanying prostatic and

urinary infection. In all of the cases the operative procedure was perineal prostatotomy.

Report of Cases

Case 1.—The patient, a white man sixty-four years of age, registered at the clinic in 1926, complaining of having been troubled with nocturia, dysuria, and frequency for the previous year. When a young man, he had had a gonococcal infection; a urethral stricture had followed and had been treated surgically. Following this he had had no symptoms except mild nocturia which had increased until, at the onset of the trouble for which he came under our care, he had been obliged to urinate three or four times each night. He had noted that the urinary stream would suddenly stop, only to start again after a short time. He had felt well generally, except for mild, intermittent gastric distress.

Physical examination revealed only a nodular, boggy, and tender prostate gland, which was moderately enlarged on rectal examination. The urine contained albumin grade 3, pus grade 2, and erythrocytes grade 1. The flocculation test for syphilis was negative. Estimations of the various constituents of the blood yielded normal values. In roentgenograms of the region of the bladder were multiple shadows, apparently from material in the prostate gland. By cystoscopic examination multiple prostatic stones were demonstrated, but there was no residual urine.

Prostatic massage resulted in so much improvement that the patient refused further treatment. He was dismissed and advised to have the infected teeth and tonsils removed.

He returned in February, 1935, because of increasing perineal pain accompanied by hematuria. For several years he had also had gaseous indigestion, and one attack of upper abdominal pain had been followed by a questionable degree of jaundice. Physical examination on this admission again gave essentially negative results, except that multiple calcified masses could be felt in the prostate. The urine, grossly inspected, was full of pus. A flat roentgenogram of the abdomen outlined the prostatic stones, and also multiple gallstones. Passage of a cystoscope was impossible because of the stones, which were fixed in position.

Through a perineal incision the prostate gland was exposed. Several large stones were removed (Fig. 1). Stone forceps were introduced into the bladder, but no stones were formed there. A split tube drain was inserted into the cavity left by the removal of the stones

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota.

and a retention catheter was inserted through the urethra.

Convalescence was uneventful. The drain was removed in forty-eight hours, and the retention catheter on the tenth day. The man was dismissed from the hospital on the seventeenth postoperative day, in good

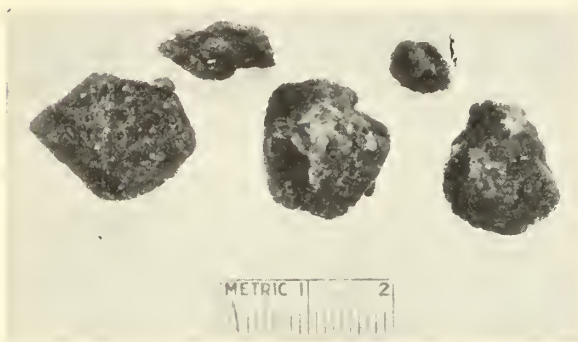


Fig. 1. (Case 1).—Prostatic stones removed by perineal prostaticotomy.

condition. Cystoscopic examination revealed a small vesical stone which was crushed and removed. There was 90 c.c. of residual urine, which disappeared under treatment with vesical lavage and administration of ammonium nitrate. The man was dismissed from the clinic on the twenty-fourth postoperative day with his incision healed and with very minor symptoms.

He returned to the clinic for reexamination six months later. The flow of urine was excellent, although moderate pyuria was present.

Case 2.—The patient was a white man, fifty-two years of age. He first came to the clinic in 1927 complaining of having had bladder trouble for the previous four or five years. Eight years before his admission he had passed a kidney stone and then had been well until the onset of his present illness. He had had mild dysuria, pain over the suprapubic region, and intermittent hematuria.

General physical examination gave negative results, as did laboratory investigation, except that pus, grade 2, was found in the urine. On cystoscopic examination an edematous right ureteral orifice, and a large stone impacted in the intramural portion of the right ureter, were found. Operation was advised for removal of this stone, but at exploration the condition of the kidney was such that nephrectomy was done. The pathologist reported that the kidney was almost completely destroyed and that its pelvis contained several small stones. Convalescence was uneventful, and the patient was dismissed from the hospital on the fifteenth postoperative day.

The patient returned in six months, with the same complaints as on his previous admission, but, as before, nothing objective was found on physical examination. Laboratory examination again gave negative results, except that there was pus in the urine. On cystoscopic examination, numerous dilated prostatic ducts, with pus oozing from them, were seen. By palpating the prostate gland, with the cystoscope in place, stones could be felt in the left lobe. It seemed improbable that the prostatic infection could be cured in the presence of prostatic calculi. Therefore, through a perineal incision the prostate was exposed and numerous small calculi were palpated in both right and left lobes. Portions of each lobe of the prostate, containing the stones, were removed and the prostatic capsule was resutured. Convalescence was uneventful, and the patient was dismissed from the hospital on the fourteenth postoperative day.

The patient returned again in 1931, stating that if he did not perform lavage of his bladder two or three times a day, tenderness appeared in the suprapubic region and he suffered from general malaise. Nothing could be demonstrated on physical examination. On cystoscopic examination a contracted bladder, containing some 50 c.c. of residual urine, was demonstrated. Several small prostatic stones were also palpated. Because of the prostatic hypertrophy, a punch operation was carried out with good results. The patient recovered from the operation, and following his dismissal from the hospital was treated by irrigations of the bladder. Then he began to run intermittent fever and seemed to lose ground steadily. One month after his punch operation, nephrostomy was performed for left hydronephrosis, apparently attributable to a ureteral stricture at the vesical orifice. The subsequent course was stormy, but the patient finally recovered.

Intravenous urograms, made three months later, gave evidence of a greatly hypertrophied kidney, but without much evidence of hydronephrosis. Function apparently was normal. This was of extreme interest because of the previous trauma to the lower end of the ureter incident to intravesical manipulations and the previous nephrostomy.

The patient was dismissed from the clinic in fair condition, and, while his condition has improved somewhat, he has reported by letter that he is still troubled by various symptoms which are no doubt attributable to his urinary infection.

Case 3.—The patient was a white man, forty-nine years of age, who came to the clinic first in 1926, complaining of frequency of urination during the previous ten years. In that time he had had occasional periods of dysuria but no hematuria. Some vesical irrigations by his physician at home had given him no relief.

Physical examination gave essentially negative results. Urinalysis revealed pus, grade 1, and albumin, grade 1. Culture of the urine revealed *Proteus ammoniae*. The concentration of blood urea was 38 mg. per 100 c.c. Cystoscopy disclosed extensive subacute cystitis, a vesical diverticulum measuring 4 by 5 cm., which emptied itself, chronic prostatitis, and dilated prostatic ducts from which pus was oozing.

In the ensuing two months he was treated by various methods with little relief. Massage of the prostate caused chills and fever, and phosphatic encrustations reappeared in the bladder as fast as they were removed. Because of the presence of prostatic obstruction by a small median bar, a punch operation was finally performed. The patient made an uneventful convalescence and was dismissed feeling fairly well.

He returned five months later complaining of increasing frequency. The urine, on gross inspection, appeared to be mixed with pus and blood. Culture of the urine again disclosed *Proteus ammoniae*. Cystoscopic examination gave no evidence of improvement in the cystitis and, in addition, it disclosed bilateral pyelonephritis. The patient's condition improved very little under several kinds of treatment.

The patient returned in 1928 with the same complaint and was again subjected to intensive treatment. Nearsphenamine, given intravenously, somewhat decreased the frequency and burning. The function of the kidneys was normal, however, and it was decided to continue medical treatment.

The patient again returned in 1931, stating that he had been fairly well until three months previously when a severe pain had developed over his left kidney, accompanied by fever. These attacks had appeared with increasing frequency until his admission. Examination revealed marked prostatitis and multiple prostatic stones. The bladder still gave evidence of extensive infection, but intravenous urograms indicated that both kidneys were normal in size and function. Because the chronic prostatitis was probably serving as

a focus of the cystitis, prostatotomy was done through a perineal incision. Three large stones, measuring approximately 2 cm. in diameter, and several smaller ones, were removed. The urethra was reconstructed over a catheter.

The patient recovered from his operation, but paralytic ileus and signs of renal failure developed. Extravasation of urine occurred anterior to the triangular ligament; suprapubic cystostomy and drainage of the scrotum were carried out, following which the patient improved greatly. However, he then progressively failed, the concentration of blood urea and of creatinine rose, and the patient died in uremia.

Case 4.—The patient first came to the clinic in August, 1929, complaining of a suprapubic sinus of eight weeks' duration. For five years he had had numerous attacks of pain simulating left renal colic. He had passed gravel and small stones. Between his attacks, he had had occasional hematuria and some dysuria. In June, 1929, after roentgenologic examination elsewhere, he had undergone suprapubic cystostomy, but a stone had not been found. The cystostomy tube had been removed after thirty-six hours, and the sinus had never healed. He had continued to have pain resembling left renal colic.

Physical examination on admission gave essentially negative results, except that the small, suprapubic, draining sinus was seen, and on rectal examination a firm nodule could be felt in the prostate gland. Laboratory investigation gave essentially negative results, except for the finding of pus, grade 3, in the urinary sediment. In roentgenograms of the pelvis was the shadow of a large stone, apparently in the prostate.

Because of the urinary obstruction, a perineal incision was made and a single calculus, approximately 2.5 cm. in diameter, was removed from the left lobe of the prostate. The levator ani muscles were brought together and the cavity left by removal of the stone was drained by a small split tube. Convalescence was uneventful and the patient was dismissed from the hospital on the seventh postoperative day.

Two weeks after operation the urethra was dilated under general anesthesia, and a cystoscope was introduced into the bladder. A small stone was removed from the left ureteral meatus, and 30 c.c. of infected residual urine was demonstrated in the left renal pelvis. The patient was treated for his urinary infection and dismissed.

He returned in November, 1929, with a persistent perineal sinus. Injection of this sinus with an opaque dye allowed roentgenologic demonstration of a small pocket in the region of the prostatic urethra, and apparently communicating with it. The sinus was dilated to the caliber of 24 French and thorough lavage with acriflaving was performed. The patient then left the clinic to be treated by his physician in his home community.

He returned in August, 1930, and said that in January, 1930, his home physician had performed prostatectomy. His complaints at that admission were of dysuria, frequency, and nocturia. His general condition was good. General examination and investigations gave negative results except for the finding of a dense stricture of the posterior urethra. This was dilated, on three occasions, to the caliber of 26 French and the patient was advised to undergo repeated dilations.

The patient reported by letter, three years after operation, that he had continued to have renal symptoms, with the passage of stones, and that an operation had been performed for removal of stones from his left kidney. He had also been troubled by frequency and dysuria, which were apparently results of his renal infection.

Summary

Four cases of prostatic stone, in which perineal prostatotomy has been performed, are reported. The surgical treatment for prostatic calculus is indicated, first, when the stone is large enough to obstruct the flow of urine; second, when by its size and position it prevents removal by transurethral methods; and, third, when removal of the calculus will allow more adequate treatment of the prostatic and urinary infection. It is obvious, from study of these cases, that surgical operation is only a stage in the treatment and that postoperative care is essential to produce amelioration of symptoms, or cure.

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EFFECT OF AN EXCESSIVE BEE-STINGING*

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SO FAR as I know, the American medical literature does not contain any account of the effect of being stung by a great number of bees. During the last summer I was simultaneously stung by 150 bees. There were 105 stings on the upper surface of the left arm, between the wrist and the elbow, and forty-five on the same surface of the other arm. I will describe the symptoms in the sequence in which they appeared.

In several minutes after I was stung, my heart started pounding vigorously and my scalp began to itch terribly. Next the area around my lips became numb, and there was a tingling sensation as though ants were running over them. The same feeling was in my feet, with the difference that "the ants" were running up toward my knees. Then I became slightly dizzy. Meanwhile the grass, the leaves of the trees, and the sky turned white. I could not feel my pulse at all. Usually fainting is preceded by a sensation of darkness, but in this case the dizziness progressed until finally I saw only a white indefinite mass before my eyes. Then I fainted. The unconsciousness lasted for only about half a minute, according to the testimony of persons who saw me collapse. I still was dizzy but I had an urge for defecation, after which I almost fainted. I lay on the ground for about ten minutes more. The leaves, grass, and sky gradually resumed their normal colors. All the symptoms lasted from

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about fifteen to twenty minutes. The swelling of the arms completely disappeared in two days.

I had been immune to bee stings and those which I got in the apiary under normal circumstances had not bothered me at all. Apparently, a simultaneous injection of 150 stings was in excess of the power of my organism to take care of without this strong reaction, but my sensitivity for bee stings was not increased.

MULTIPLE NONOPAQUE FOREIGN BODIES IN THE ESOPHAGUS*

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MANY cases of multiple foreign bodies in the esophagus have been described, especially in infants and in persons suffering from mental disturbances. These foreign bodies have usually been opaque to roentgen rays and have consequently been easily identified. When



Fig. 1 (left). Portion of meat found in upper part of esophagus at first esophagoscopy examination.

Fig. 2 (right). Bolus of chewed meat found in lower esophagus.

such foreign bodies are nonopaque, however, the problem of diagnosis becomes more difficult, as is illustrated by the following case:

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota.

A man, fifty-eight years of age, was admitted to the hospital for treatment for essential hypertension and morphinism. He had lost all his teeth and wore dental plates; in other respects the findings had no bearing on the patient's esophageal difficulty.

A week after the patient's admission to the hospital

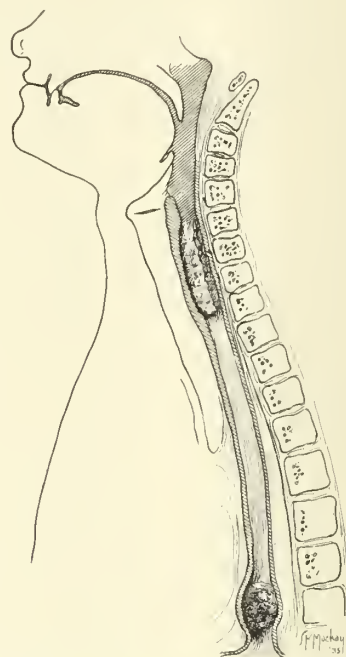


Fig. 3. Showing the relative positions of the two foreign bodies in the esophagus.

he said that a piece of meat had stuck in his esophagus and that he was having much discomfort. At first it was thought that he made this complaint because of a desire to obtain an increase in the dose of morphine, which was being gradually restricted. Later, an esophagoscopy examination was made and a large piece of meat which had not been chewed was found in the upper portion of the esophagus (Fig. 1). It was too large to remove through the esophagoscope, so the tube had to be withdrawn from the esophagus when the foreign body was extracted. After removal of this foreign body, the patient stated that he was much more comfortable, but he was still unable to swallow either solid food or liquids.

Fluoroscopic examination on the following day revealed an obstruction in the lower portion of the esophagus after a small amount of barium mixture had been ingested. A second esophagoscopy examination was then made, and another large bolus of meat which had been partly chewed was removed from the lower portion of the esophagus (Figs. 2 and 3). The esophageal mucous membrane was normal in appearance and there was no evidence of stricture.

There were no further symptoms referable to the esophagus during the remainder of the time the patient was under observation.

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Pituitary Solution in Herpes Zoster

THE patient who has herpes zoster almost invariably calls on the physician for relief of the pain which accompanies this disorder. The pain varies in degree and duration, but tends to be less severe in young individuals. In patients past forty-five years of age, the pain is likely to be very severe, and occasionally lasts for one or more years. Therefore, any therapy which will relieve the pain of herpes zoster should be included in the armamentarium of all physicians. A review of the literature revealed five articles in which the writers reported dramatic relief of the pain of acute herpes zoster, by injections of solution of pituitary. Failure was reported in two cases; in both of these cases solution of pituitary was administered for the relief of post-herpetic neuralgia.

The first report of the administration of solution of pituitary in cases of herpes zoster, which was made by Vendel, appeared in the Scandina-

vian literature in 1923. This writer said that nine patients were relieved within a few hours, and cured within a few days, by subcutaneous injections of pituitary extract. Nine other patients were treated in the usual manner, with the usual results.

In 1930, Sidlick, of Philadelphia, reported relief of pain of herpes zoster with injections of solution of pituitary. This was the first report in the American literature. In 1932, Niles, of New York, reported a series of sixteen cases of herpes zoster in which the patients were treated with pituitrin; the results in these cases compared favorably with the results in a control group of cases in which the patients were treated with other methods. The only failure was in two cases in which post-herpetic neuralgia had been present for eleven months and seven weeks, respectively.

Gillett, in 1934, was the first to report the use of this preparation in cases of herpes zoster in England. He presented brief histories of three cases in which administration of pituitrin produced dramatic relief of pain. He concluded as follows: "I have found that the injection of pituitrin is an uncertain, and by no means an infallible, treatment. It appears to act most dramatically when the pain is most intense." Ravn, in 1935, reported one case in which the result was dramatic. He also said that Prusik treated two patients successfully with pituitrin.

The technic of administration varied little in all reports. Niles found surgical and obstetrical pituitrin equally effective when administered intramuscularly in doses of 1 c.c. The relief occurred in from one minute to several hours. Usually, one, two, or three injections, on successive or alternate days, were sufficient.

The only contraindication to the use of solution of pituitary appears to be pregnancy. To hypertensive and senile patients Niles administered only 0.5 c.c. as an initial dose. The only untoward result reported was a momentary sensation of faintness. Cramping pain in the abdomen may occur after its administration.

Four physicians, in personal communications, have estimated that they have administered solu-

tion of pituitary from five to thirty times in cases of herpes zoster. Only one could recall any case in which it was effective.

In conclusion, the reports concerning the relief of pain in herpes zoster by injections of solution of pituitary are few, but highly favorable. They record the relief of pain of acute herpes zoster but do not report the relief of postherpetic neuralgia. In fact, two failures in the presence of the latter condition are presented. It is suggested that this therapy be tried widely. If it is not found to be as effective as the reports indicate, an unbiased report of a long series of cases is in order.

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Child Adoption and Doctors

IT happens not infrequently that the practitioner and more often the obstetrician is called upon to officiate at the delivery of an illegitimate child. With the best of intentions he may occasionally attempt on his own responsibility to assist the mother in disposing of the child and providing a child for adoption by some desirous couple. In this way he would seek to avoid publicity and to him unnecessary legal proceedings.

That this is not the best way of handling a delicate situation was brought out clearly in an address* by the Honorable Edward F. Waite before the Hennepin County Medical Society. In assuming the responsibility for meeting this situation the physician may be doing the child an injustice.

A child is assumed to have certain rights. He is entitled to care and education and the state is by law responsible in event a child is found to lack the protection of "reasonably competent par-

ents." Certain provision has therefore been provided in civilized countries to protect children.

Baby farms and orphan asylums were common in Minnesota until 1917 when the state laws were revised and County Child Welfare Boards established to represent locally the State Board of Control. It is the function of these County Boards to investigate by means of trained workers cases of illegitimate birth or proposed adoption and to obtain all possible information as to paternity, property rights, character of foster parents, et cetera, before adoption is sanctioned. Every effort is made to provide for permanency in adoption and a trial period of six months is now provided before legal adoption is culminated.

The County Board, having an element of permanency, is in a position to follow adopted children to assure that they are being well provided for, whereas an individual's assumed responsibility naturally ceases when he is instrumental in providing a new home.

It is not difficult for a reasonable person to understand that the present mechanism provided by the State for supervising adoption of illegitimate children is much better in the long run than for individuals to assume this responsibility, although in individual cases the latter solution may prove satisfactory to all concerned.

Home adoption has largely replaced the orphan asylum in Minnesota and it is the consensus of opinion among social workers that this is a step in advance. Incidentally, it is interesting to learn elsewhere that the demand for babies for adoption is much in excess of the supply, such is the realization that children are a necessary supplement to a home.

Our Advertisers

FROM time to time editorial mention is made in MINNESOTA MEDICINE of the importance of our advertisers to the success of our publication. Advertisers in most medical journals are relied upon to make subscription prices come within the reach of medical men.

Much of our advertising, as well as that of most state medical journals, is obtained by the Cooperative Medical Advertising Bureau of the American Medical Association at a much lower cost than each journal could obtain the business individually. This material is investigated and approved by the Bureau before it is sent to the

*Waite, Edward F.: Child Adoption in Minnesota. *Bull. Hennepin Co. Med. Soc.*, 7:19, (Feb. 25) 1936.

State journals. The remainder of our advertising is obtained locally and care is exercised that only bona fide advertising is accepted.

Some journals run advertisers' columns in which additional information in the nature of news items regarding the various advertisements appears. MINNESOTA MEDICINE has never carried such a column inasmuch as it has been felt that this is a duplication of advertising space. We have always been rather careful to avoid editorial mention of any one advertiser inasmuch as all are entitled to the same consideration. Mention of each advertisement in a special column would require considerable space.

Advertising, of course, is of mutual benefit to advertiser and reader, as well as being essential to the existence of the journal. Our readers are urged to peruse more carefully our advertising pages and mention MINNESOTA MEDICINE when making purchases.

Cyclopropane for Anesthesia (Ohio Chemical and Manufacturing Co.)

The Ohio Chemical & Manufacturing Co. presented Cyclopropane for Anesthesia for the consideration of the Council on Pharmacy and Chemistry for the purpose of issuing a preliminary report. Cyclopropane was first noted as trimethylene by von Freund in 1882. It is an inflammable gas, less explosive than ethylene or nitrous oxide-ether mixtures. No explosions have been reported and the closed circuit technic of administration helps to avoid them. More than 5,000 clinical administrations have been reported in patients of all ages and in practically all surgical conditions. In obstetrics the agent seems to have been more useful than in other fields. It is recommended for all types of individuals, and in grave circulatory risks and extremely ill patients, largely on the basis of the high oxygen concentration possible with this anesthetic. The induction is rapid and pleasant, and there is no choking or burning. It is a powerful agent of low toxicity in adequate concentrations and is nonirritating. The usual pre-operative procedures have been used with this agent, and also the barbiturates and spinal agents. Less premedication is said to be required and even preferred with this agent. In ordinary concentrations there is said to be very little effect on the blood pressure. The effect on the heart is slight, as indicated by the clinical notes and electrocardiographic studies. In the 4,400 cases referred to by Waters and Schmidt in their most recent study, cyclopropane suffered by comparison on the basis of cardiac complications (in spite of the advantages of high oxygen concentration). These investigators report a mortality of 4.16 per cent as compared with 3.99 per cent with other agents. This figure is not at marked variance, but the attempt is ever to prevent just such small increases. The Clinical Congress of Anesthetists which met Oct. 15, 1934, in Boston, placed this agent on a carefully controlled program of distribution and use for one year. The Council has deferred further consideration of Cyclopropane for Anesthesia (Ohio Chemical and Manufacturing Company) until more evidence of its usefulness is available. (J. A. M. A., January 25, 1936, p. 292.)

OBITUARY

"... he went down.

As when a lordly cedar, green with boughs,
Goes down with a great shout upon the hills
And leaves a lonesome place against the sky."

John B. Dunn

1860-1936

DR. JOHN B. DUNN, St. Cloud, died at the age of seventy-six on February 6, 1936.

A graduate of Rush Medical College in 1882, Dr. Dunn was one of the pioneers in central Minnesota, coming to the state in the early nineties. He retired from practice some twelve years ago.

His wife and three daughters survive him.

William Sommerville Fullerton

1857-1936

DR. WILLIAM S. FULLERTON was born at Round Hill, Nova Scotia, September 18, 1857. He was educated in grade and high school at Annapolis Royal, Nova Scotia. His higher education was begun in Dalhousie College, Halifax, and completed with his graduation from Bellevue Medical College, New York City, in 1881.

He began practice of medicine at Bear River, Nova Scotia, where he was married in 1882 to Miss Ida L. Moore. They reared five children.

He moved his family to Minnesota in 1884, settling first in St. Paul, but very soon took the position of physician for the Duluth-Iron Range Railway during its construction. It was during this service that on several occasions he was forced to use dog sleds in calling on some isolated patients, in northern Minnesota. In 1900 he returned to St. Paul, where he practiced medicine and surgery until about 1925, when he retired from active practice. He was for a period a member of the State Board of Medical Examiners, and served for several years as chief of the x-ray service at the Ancker Hospital.

Dr. Fullerton was made a Master Mason in Keith Lodge No. 16, Bear River, Nova Scotia, on January 1, 1883, a little more than fifty-three years ago, and he affiliated with Ionic Lodge No. 186, Duluth, soon after moving there. In 1908 he affiliated with Ancient Landmark Lodge, Saint Paul, in which he served a term as Worshipful Master.

After some years of failing health, Dr. Fullerton passed away February 7, 1936, in Saint Paul.

David Edward Seashore

1875-1935

WE pause in the busy course of our professional lives to dwell—as in the lines of Wordworth—“on that best portion of a good man's life, his little nameless, unremembered acts of kindness and of love.”

David Edward Seashore was born February 4, 1875, on a farm near Dayton, Iowa. His father, a Swedish Lutheran preacher, was Earl Gustaf Seashore and his mother was Ameli Emily Seashore. Doctor Seashore attended Gustavus Adolphus College for three years and then taught school at Marine Mills and also at West Union, Minnesota. He then went to Iowa University two years and later to the University of Minnesota, where he acquired his degree of Doctor of Medicine in 1902.

Doctor Seashore started his professional career at Battle Lake, Minnesota, where he practiced three years. He came then to Duluth in 1905 where he carried on an active practice until the time of his death, November 4, 1935. He was a member of the St. Louis County Medical Society, Minnesota State Medical Association, American Medical Association, American College of Surgeons, Interurban Academy of Medicine, and the Staffs of St. Mary's and St. Luke's Hospitals.

He was a member of the Duluth Board of Education at one time early in his career and in other respects showed himself civic-minded and coöperative. He was a great admirer of the work of the late Dr. J. J. Eklund and for a number of years he worked in close association with Doctor Eklund.

Doctor Seashore was a member of the Episcopal Church and of the local Masonic bodies, including the Shrine. He knew how to play, to take a reasonable amount of recreation, and to this end he was for many years an active member of the Ridgeview Golf Club and of Northland Country Club. He also went to Florida several winters for short seasons of golf and recreation.

This beloved fellow practitioner, whose passing we regretfully acknowledge, was a tolerant and helpful friend and one of the most popular men in our profession. He was always devoted to his patients and he had one of the largest followings in Duluth. He was thoughtful and studious in keeping up to date, but he followed largely the words of Pope:

“Be not the first by whom the new are tried,
Nor yet the last to lay the old aside.”

Doctor Seashore was aware of his cardiac instability for several years. He became more deliberate in the manner of his moving. He practiced economy of effort and had recently given up strenuous exercise in order to attend his patients as long as he could.

It is with grief that we announce his passing. He leaves a wife and two children and to them we extend our deep sympathy in their bereavement.

ARTHUR N. COLLINS, M.D.

ROBERT S. FORBES, M.D., *Chairman.*

Frederick W. Van Valkenburg

1898-1936

DR. Frederick W. Van Valkenburg, physician and surgeon of Long Prairie, Minnesota, was killed instantly and his wife injured slightly when, on February 8, 1936, a truck collided with the car in which they were returning from Minneapolis to their home. The accident occurred on the State Highway just south of Anoka.

Dr. Van Valkenburg was born in Long Prairie on February 21, 1898, the son of Dr. B. F. and Bessie Van Valkenburg. He received his early education in the city of his nativity and soon after his graduation from high school he entered the University of Minnesota to study medicine. His medical education was interrupted by his enlistment in the 812th Aero Squadron, with which he went overseas. At the conclusion of the war he returned to his professional studies and received his doctorate in medicine from the Medical School of the University of Minnesota in 1925. His clerkship was spent at the Charles T. Miller Hospital in Saint Paul, and both his junior and senior internships at the Ancker Hospital of Saint Paul.

After graduation he became associated with his father in the practice of medicine and surgery at Long Prairie. During 1927 he went to the Cook County Hospital in Chicago for post-graduate studies in surgery. There, on June 21, he was married to Miss Constance Payte, of Saint Paul. In 1933 he began a fellowship in surgery in Philadelphia under the University of Pennsylvania Medical School. Returning to practice in Long Prairie, in 1934 he accepted the post of Resident Urological Surgeon at the Newark City Hospital in New Jersey. He had been in practice only eight months following this training when the fatal accident occurred.

Dr. Van Valkenburg was a member of the Todd County Medical Society, the Upper Mississippi Medical Society, the Minnesota State and the American Medical Associations. While he was in Long Prairie he was a member of the Todd County Medical Advisory and Contact Committee and he served as secretary of the Upper Mississippi Medical Society in 1933. He was a member of the Phi Rho Sigma medical fraternity and of the Masonic Lodge and American Legion.

He is survived by his wife and daughter Sally, his father and stepmother, Dr. and Mrs. B. F. Van Valkenburg, and a brother, Dr. L. K. Van Valkenburg, a dentist, of Long Prairie. His wife and daughter will make their future home in Saint Paul.

In the death of Dr. Van Valkenburg the medical profession loses one of its most loyal and respected members. He was an ardent student and devoted most of his time and effort to professional advancement. His medical knowledge and surgical ability were sources of inspiration to all of his medical associates and his friendship was cherished by all who knew him well. Besides his loss to the profession, Long Prairie mourns his death as one of its major catastrophes.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.
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What Can I Do for My County and State Medical Society

Following are some important suggestions made under this heading during the last four months:

1. To assist high school debaters.
2. To study the problem of care for the sick poor in each county and to establish good working relations with local officials responsible for such care.

3. To study the Social Security program as it affects medical care in Minnesota and to strengthen local county contacts with all health and welfare agencies that will be concerned in the new program.

4. To avoid thoughtless remarks on social medicine that may work injury to organized medicine and medical practice.

Have all of these important matters been discussed in your own society meetings?

Has your society complied with the suggestions which especially apply to conditions among your own members in your own county?

If not, can you be certain that you, personally, are doing your duty by your own society?

* * * *

Be sure to arrange for a complete report at your next society meeting from your delegate to the 1936 County Officers Meeting.

Thanks to Dr. Fishbein

When the medical profession of America takes account of its blessings—as it should now and then even in the midst of the alarums and excursions occasioned by the latter day itch for sweeping reforms—it must certainly thank its lucky stars for Dr. Morris Fishbein.

As a combination of popular educator, lecturer, writer, editor, he is without equal in any scientific field in America or the world today.

There are other writers—there are orators—there are scholars. But there is only one man who combines the prodigious knowledge, the forceful style, the ability to speak at any time

before any kind of audience, not only with accuracy and effectiveness but with the technic and entertainment value of the most famous artists of the stage.

Physicians all agree that one of the principal functions of medical organization today is public health education.

For Public Education

An intelligent, well-informed lay public is, without doubt, the best defense against the damaging socialization of medicine: It is the best answer to the modern problem of good medical care for all the people.

Medical associations are justified in spending large sums of money to contribute as effectively and rapidly as possible to the development of that kind of lay public in the United States.

Dr. Fishbein, because he is a personage known to every doctor and to millions of people all over the country as an entertaining personality, as well as an authoritative educator, commands columns of space in the daily newspapers and is paid for filling them.

State medical societies that prepare and send out their own press service do not compete with Dr. Fishbein. They send their material to the country weeklies that are unable to purchase the syndicate services that employ Dr. Fishbein.

Without Expense

But the American Medical Association, in effect, sends a press service to the metropolitan newspapers in nearly every city of any size in the country—and without the expenditure of a single cent of its money.

Dr. Fishbein prepares and syndicates his daily health column under his own name and on his own responsibility. We could wish that in every paper he was specifically identified with the American Medical Association. It is unfortunate that many papers prefer only his personal en-

dorsement. But, in the eyes of America, he stands for the American Medical Association anyway. And every single doctor, as well as the cause of popular health education, reaps the benefit.

At frequent intervals Dr. Fishbein visits Minnesota in person. Sometimes it is at the invitation of the state society. Sometimes it is the Minnesota Education Association or the Minnesota Public Health Association, the state Parent-Teacher organization or the colleges who ask for him.

Heard by Thousands

When he comes he is always genially available to us to speak three and sometimes four times above and beyond the principal address of the day, and always it is as a visiting celebrity and never as a propagandist for any organization.

A total of many thousands of persons often hear Dr. Fishbein in a single twenty-four hours here. Year after year they come in crowds and—what is equally significant—they spend their own money for the privilege.

What they get is not only authoritative information on health and on new developments in medicine but also the philosophy, ideals and aspirations of the practicing physician—and a good show besides.

If anything should happen to Morris Fishbein we know of no one in America who could take his place.

Help for the Negative

Victory seems to be going heavily to the affirmative in the high school debates.

There were twenty decisions for the affirmative against ten for the negative in the last report of the regional meets received from Mr. O. E. Smith, executive secretary of the Minnesota High School League.

The subject: "Resolved: That the several states should enact legislation providing for a system of complete medical services available to all citizens at public expense."

The question arises again: Are the doctors doing all they can to help the debaters?

The state office has sent out a great deal of material, including the Minnesota Handbook, to all parts of the state.

But personal contact and individual aid is worth more than printed pamphlets. It should

have been supplied by friendly local physicians to supplement all the debate material on the negative side of the issue.

Neglect of Duty

If it was not supplied in the towns where the battle has been lost, the local physicians may justly be charged with neglect of duty. An opportunity has been irrevocably lost.

Of course, the best of aid and assistance will not win a debate for stumbling debaters. But it hardly seems possible that there were twice as many clever talkers on the affirmative as on the negative side of the question.

There are still many regional debates to be staged before the April finals.

Physicians in the towns where the contests are yet to come off should act *now*.

New Deal for Relief

The problem of medical care for the indigent is now coming to a head in many quarters of the state.

All relief is being re-organized under the direction of the Executive Council and the SERA with the responsibility placed back with the county and township.

Where does that leave the physician, particularly in the rural county?

At the end of all the vicissitudes of Federal Relief as it affects medical care, the whole relief problem is back on the doorstep of the county court house and the town hall.

Pivotal Point

The physicians who have been energetic and far-seeing enough to establish good working relations with the officials within those structures are now, at this pivotal point in relief re-organization, in a good position to care for the sick poor in their communities efficiently and with some degree of satisfaction to themselves.

The others are struggling along under that outworn institution, the under-paid county physician, or with no official provision or agreement whatever. Result: an unbearable burden of charity work for the physicians and inadequate care for the poor.

This is a problem which no stranger, no privy council of higher-ups from outside, can handle.

It is a problem for the County Committee of

Three, representatives of the physicians who live and practice in the county or the township, to settle.

Physicians Must Act

If the situation is unsatisfactory, it is for the physicians to decide what best can be done about it and bring their suggestion to the proper authorities.

In so doing, the experience of other physicians elsewhere who have successfully negotiated with their local officials may well be heeded.

It is of no use, these others have found, to appear abruptly with a slightly wild, if idealistically sound, program before these hard-pressed and often hard-bitten personages.

Physicians should take the trouble to acquaint themselves, thoroughly, with the local situation, the problems of the commissioners, the practical possibilities for a change in the method of handling medical care in their communities. They should talk the matter over thoroughly, informally and confidentially with these same officials before they appear officially before the county or town meeting with their plans and woes.

Survey

That it can be done is shown by the fact that some thirty-five counties in Minnesota are known to be handling their medical care for the indigent on a fee basis and through all the practicing physicians of the community in a reasonably satisfactory manner. Sixteen others have established themselves on the fee basis, but, for reasons having largely to do with the general unsatisfactoriness of the Township System for relief, are not operating to the complete satisfaction of the physicians.

These figures are derived from a survey now being conducted by the State Office of the various methods of handling the indigent sick problem throughout the state.

The survey shows, to date, that at least twelve counties still employ a county physician or physicians.

Contract Experiments

The Survey has shown, in addition, that no less than seven counties are experimenting with the so-called "contract plan" whereby a lump sum is appropriated by the county authorities for medical relief which, in turn, is pro-rated

among all of the physicians of the community.

These plans have, in most cases, been put into effect very recently and no report of how they work can be made as yet. They show a tremendous advance over the old time county physician plan and a great improvement in the "physician-county commissioner" relationship.

Twelve counties had reported the presence of county physicians as this issue went to press. Others reported an unsatisfactory combination of the county physician and the "fee basis" plan, while a few others reported an absence of any official arrangement for care of the sick poor.

County Responsibility

The responsibility for the care of the indigent rests squarely with the local authorities—with the county commissioners in the case of the county plan and with township officials in the counties where the township plan still exists.

That responsibility was well established legally long before federal relief dislocated somewhat local delivery of relief. It remained even during the emergency, as an interpretation and opinion from Attorney-General Harry H. Peterson that was printed in these columns last year, re-affirmed.

It is now more obvious and more securely established than ever before, as the relief organization prepares to return to the individual counties and municipalities the administration of relief.

County Commissioners to Hear Physician

Aid and assistance to the physicians and their Committees of Three should result from the meeting of the State Association of County Commissioners scheduled for February 27 and 28 in Minneapolis.

For the first time in history, a physician will appear before this state convention of commissioners to explain the doctor's position and the desirability of organizing all local medical relief on the fee basis with free choice of physician.

The physician chosen for this task is Dr. O. E. Locken, of Crookston, whose experience as Mayor of Crookston and as president of the League of Minnesota Municipalities gives him an excellent working knowledge of local governmental affairs as well as of medical problems.

Dr. Locken's discussion should assist greatly in promoting understanding and good will among the county commissioners of the state.

SERA is Interested

Aid has been received from another important quarter, too. A recent bulletin from SERA headquarters in St. Paul to their county workers included the following paragraphs:

"A Way of Giving Medical Care"

"As a means of handling the problem of medical care, some counties are considering apportioning so much money for medical expenses of the entire year, making agreements with the physicians of the county whereby they will take care of all indigent medical cases for the stated fund. The apportionment of the allotted sum among the physicians would be handled entirely by them on the basis of the services rendered by each.

"There are many possibilities and ramifications to this suggestion, but we feel that it is worthy of much thought and consideration. We should like very much if county welfare boards and relief committees would discuss it fully at their next meeting, or as soon as possible, and incorporate the gist of that discussion in the county minutes so that we may know what the various counties think of the plan."

Counties Step Into the Lead

The relief bill passed by the legislature at its special session made available the sum of \$7,625,000 for the period ending July 1, 1937. Of this sum \$1,250,000 is tentatively set aside exclusively for disabled veterans' aid.

General responsibility for expenditure of this fund now rests with a state Executive Council.

This council in its turn has vested the SERA with full authority to "supervise, direct and control." But direct responsibility for the expenditure of funds in each county lies now with the county commissioners or the agency designated by that body.

SERA headquarters in St. Paul will have universal supervision and it must approve the local administration of relief. Its jurisdiction will include the social service aspects of relief and extend to accounting and the distribution of surplus commodities. On the other hand, the county relief unit developed by the SERA will now be withdrawn in theory and a local county organization will take its place. Actually, in most localities where SERA is still functioning, the county commissioners are quite likely to take over the

existing relief organization for their own purposes.

Medical Care for Pensioners

Thus local county or municipal government steps into the lead again in the management of local relief and also in administration of payment of Old Age Pension authorized by the last legislature.

Administration of old age assistance is subject, in its turn, to supervision of a state agency appointed by the Board of Control.

The law prohibits all other relief to old age pensioners with the explicit exception of medical, dental, surgical, hospital or nursing care.

Here, again, the county commissioners or a board appointed by the commissioners is in direct local control. It is the county that is responsible for supplying the medical care that is thus allowed in the law.

Physicians through their Committees of Three should make a special point of talking over this matter of medical care for old age pensioners with their county commissioners. They must see that the point is thoroughly understood and will be acted upon with fairness to pensioners and physicians by the county relief unit.

Our Problem to Solve

$$\text{Doctor} + \frac{\text{Patient and Second Doctor}}{\text{Lawyer and Expert Witness}} = \text{Malpractice Case}$$

Malpractice litigation in order to be brought to a successful issue for the complaining party must have certain elements:

1. *The disgruntled or mistaken patient.*—In Minnesota less than 2 per cent of the cases brought are justifiable from any standpoint.

2. *The tactless, envious or rejoicing second doctor on the case.*—In our state more than half of the cases are started in the hope of damaging the reputation of the first attending physician or exalting the work of the second man on the case.

3. *The lawyer for the plaintiff.*—We are fortunate in having less than 5 per cent of the practicing lawyers in Minnesota who will take a case against a doctor. Attorneys in the majority feel that the damaging of the reputation of a professional man of any calling will harm all of the learned professions.

4. *The expert witness for the plaintiff.*—A man who sells the birthright of a noble profession for a few pieces of silver. It may be good that each profession has these among their number: maybe they are the stimulus that holds us all to better work.

Remove any one from our equation and you have the answer. *No malpractice case.*

The more than 2,000 men in our society can by care and example eliminate one or more during 1936. The aim of the Medico-Legal Advisory Committee: *Fewer cases will then be accomplished.*

Hats and Sofas

Notes on regimentation:

Dr. Walton H. Hamilton of Yale University is a much quoted authority on economics and social science.

Dr. Hamilton tried very hard to help the other doctors of economics and social science and public health of the Committee on Costs of Medical Care find out what is wrong with medical care in America and what to do about it.

Last week, Professor Hamilton reasonably proposed, in a widely published Associated Press story, to standardize women's hats and clothes.

Women pay too much for their clothes, particularly their hats, said Professor Hamilton.

What they really pay for is style, the atmosphere of an exclusive small shop, a label in the lining.

Now, atmosphere and a label perform no useful service in covering women's heads as the professor pointed out. And covering the head is presumably the real object of a hat.

Thus atmosphere, individuality, labels should be thrown out. Women's hats should be standardized, said the professor.

In Alaska, too

In Alaska one day last fall a woman friend who was making a tour of the Matanuska Valley came upon a perplexed official completely surrounded by mail order catalogues.

The official was engaged in selecting furniture for colonists. He wanted to buy chairs and davenports wholesale that would combine comfort, economy and durability.

He appealed to our friend for help, and our friend in her turn, being full of misgivings, suggested a committee of women colonists.

The committee was appointed forthwith and retired to the great Alaska outdoors to make its deliberations.

Inside, our friend and the official waited impatiently for his committee.

Eventually the official sent her to find his committee on furniture and report.

Our friend went. She found a group of disgruntled women who spoke with spirit and force and to the following effect.

"We'll Do Without"

"We don't want furniture that's just like everybody else's in this colony."

"If I have to have the same chair in the same corner as every other woman in Alaska I don't want any chair at all."

"You can tell him for me I'll just get along without any furniture if he's ordering."

Our friend reported faithfully and with speed and the women of Alaska chose their own furniture from the mail order catalogues.

Choosing Doctors

The women of the United States and Alaska will probably continue to demand the right to choose their own hats without too much regard for durability and economy, as well as their furniture.

They will also continue to pick their own doctors, probably, either by open rebellion or by sly devices no matter what standardization may eventually be forced upon them by the wily politicians who seize upon the so reasonable arguments of the theorists in social science.

At least we hope they will do so. If they do not, it will be a sign that we have degenerated sadly in a few short years from the sturdy independence of our American forebears who threw off the paternalism of a still feudal Europe to make their own freedom in a new world.

New Seal

The Council of the Minnesota State Medical Association has gone on record as officially opposed to the new Easter Seal sale proposed by the Minnesota Association for Crippled Children.

Their reason is not that they are opposed to the work of the association for crippled children. They are opposed to the use of the seal as a method of raising funds because it endangers the tuberculosis campaign in the state which has long been supported by the sale of Seals at Christmas time. The seal sale method of fund raising belongs by priority and by many years of intensive development to the National Tuberculosis Association and its affiliated societies.

To encroach upon the method is to weaken it for all concerned, in the opinion of the Council.

"Sex Doctor"

Medical men will be interested to know that Mr. M. Sayle Taylor, radio's Voice of Experience, who has been lending radio assistance to various welfare agencies, is a former patent medicine salesman and "doctor" of sex books and sex movie fame.

Not so long ago "Dr." Taylor was lecturing at Madison Street movies in Chicago with sex shows "For Men Only" and "For Women Only." Also he was issuing pamphlets with intriguing titles such as: "Facts for Wives—Plain Truths about Marriage"; "The Secret of Youth and Charm"; "How to Know Your Affinity"; "A Study of Glands," and "Sex Vigor."

His movies were billed thus: "Dr. M. Sayle Taylor's 'Married Love,' 'Solving the Problems of Lost Manhood' and 'Showing How to Retain Virility, Power and Pep.'"

All these and more interesting facts about "The Voice of Experience" were printed by the Bureau of Investigation of the American Medical Association in the *Journal*, March 12, 1932.

Memorial for Dr. Johnson

The first public announcement by the state society's Herman M. Johnson Memorial Committee is to be made at the County Officers' Meeting at the Lowry Hotel in St. Paul, February 29.

The committee will ask contributions from the entire membership of the society for this memorial. A letter to that effect will shortly go out to all physicians of the state.

The memorial contemplated will probably take the form of a lectureship to be devoted to medical economics.

It was owing to Dr. Johnson, individually, more than to any one man that the excellent laws protecting the practice of medicine and the public against quacks and cults were passed in Minnesota.

It is, therefore, especially appropriate to consider a lectureship which shall continue his work

as a living force in the instruction of the future doctors of Minnesota.

Regional President

Dr. W. F. Braasch of Rochester was elected 1936-37 president of the Northwest Regional Conference at Chicago, February 16.

Minnesota men who attended the meeting were Dr. W. W. Will, Bertha, president of the state association; Drs. H. Z. Giffin and Braasch of Rochester; Dr. B. J. Branton, Willmar; Dr. L. L. Sogge, Windom, and Dr. E. A. Meyerding, St. Paul.

It is interesting to note that the conference was originally organized in Minnesota in 1927 during the term of office of Dr. Braasch as president of the state society. It was held in St. Paul every year thereafter until 1936 but will be held in Chicago again next year owing chiefly to the fact that, with Indiana, Michigan and Illinois now interested members of the conference, the central point is Chicago.

Minnesota State Board of Medical Examiners

Re J. J. Heizman, Chiropractor

In the fall of 1935, for a period of about six weeks, one J. J. Heizman, who represented himself as a chiropractor, maintained an office at Stephen, Minnesota. He ran the following advertisement in the *Stephen Messenger*:

ANNOUNCEMENT Dr. J. J. Heizman Chiropractor

Announces the opening of offices in the F. C. Woods Building in Stephen, Minn., on September 5, 1935. Dr. Heizman is a graduate of the University of Zurich, Switzerland; a graduate of the Peerless College of Chiropractic, Chicago, Ill. Dr. Heizman has been Superintendent of the U. S. A. Base Hospital, Civilian Dept., Norfolk, Va.; Secretary of the Georgia Chiropractic Association and President of the Atlantic Chiropractic Association, with many years of experience.

Office Hours: 1:00 to 5:00 P. M.
Telephone No. 110
Stephen, Minn.

This advertisement appeared for the last time in the Stephen paper on October 3, 1935. Shortly thereafter Heizman left Stephen. This man does not have a Minnesota Basic Science certificate and therefore has no legal right to practice chiropractic or any other form of healing in the State of Minnesota. If he should appear in your community the Minnesota State Board of Medical Examiners respectfully asks that it be immediately notified at 524 Lowry Medical Arts Building, St. Paul, Minnesota.

OF GENERAL INTEREST

Dr. W. R. Humphrey of Stillwater, who had the misfortune of sustaining an impacted fracture of the hip January 16 is reported well on the road to recovery.

* * *

Dr. J. S. Holbrook, Dr. V. I. Miller and Dr. G. A. Dahl, of Mankato, are motoring through the South and Florida. They will return about the 15th of March.

* * *

Dr. J. T. Schlesselman was injured in an automobile accident recently. His injuries consist of several broken ribs, and a minor head injury. He is doing nicely, and will soon be at work again.

* * *

Dr. Gage Clement, roentgenologist, St. Luke's Hospital, Duluth, is recovering at home from recent severe pneumonia and empyema. He plans a trip to the Southwest for further recuperation.

* * *

Dr. and Mrs. Frank Hirschboeck of Duluth have gone to Florida (reasons not given and none is requested). They expect to return via Detroit for the meeting of the American College of Physicians.

* * *

Dr. and Mrs. W. A. Coventry of Duluth left about February 23 for Honolulu. A special volcanic eruption is being planned to entertain them adequately lest there be too much let-down after W. A.'s strenuous year as president of the State Society.

* * *

The Blue Earth County Medical Society renewed the contract with the County Board to take care of the county work for the year 1936. This was on an experimental basis up to the 1st of January, 1936. It seems to be working out satisfactorily for both parties.

* * *

Dr. and Mrs. Gordon Watson of Soudan, Minnesota, are on a trip to Europe. They are visiting the usual medical centers and plan to spend time especially in Vienna. They have taken their car with them and their envious friends foresee for them delights unnumbered. Dr. Maurice Strauss, finishing his internship at St. Mary's Hospital, has charge of the Soudan Hospital in Dr. Watson's absence.

* * *

Dean Elias P. Lyon, who has been dean of the University of Minnesota medical school for twenty-three years, will retire June 30, 1936. In point of service he is the oldest medical dean in the country, having come to Minnesota in 1913 from St. Louis University, where he served as assistant dean of the medical college from 1907 until 1913. Dean Lyon was born in 1867. He graduated from Hillsdale high school and Hillsdale College in Michigan. He received his Ph.D. degree at the University of Chicago, later taking additional work at Heidelberg and St. Louis University.

A special program of lectures and demonstrations in medicine will be held under the direction of The Mayo Foundation from April 6 to 10, inclusive. Mornings will be devoted to surgical and medical clinics. In the afternoons and evenings, in addition to clinico-pathologic conferences, symposiums will be conducted on various phases of gastro-enterology, urology, acute and chronic empyema, vascular diseases of the extremities, hypertension, orthopedics, and oral plastic surgery.

* * *

The fifteenth anniversary of the organization of the Nicollet Clinic was celebrated in Minneapolis at the Radisson Hotel on Saturday evening, January 25, 1936. A large number of friends in the profession enjoyed the excellent program and banquet with members of the group.

Dr. S. Marx White introduced the toastmaster, Dr. Jennings C. Litzberg. Stimulating addresses were made by Mr. Fred B. Snyder, president of the Board of Regents of the University of Minnesota, and Dr. Walter Biering of Des Moines, Iowa, former president of the American Medical Association. Dr. Biering discussed recent trends in medical progress and the proposed certification of specialists.

The esteem in which individuals of this group are held was demonstrated by the representative attendance of members of the medical profession at this anniversary celebration.

* * *

Venereal Disease Information is a monthly publication prepared by the U. S. Public Health Service for distribution among the medical profession throughout the United States. It is the purpose of the Public Health Service in issuing this publication to provide in condensed form a monthly summary of the scientific developments in the diagnosis, treatment, and control of syphilis and gonorrhea. More than three hundred American and foreign journals are reviewed for this work. During the past year thousands of physicians found this publication useful in enabling them to keep abreast with developments in venereal disease work. Anyone interested in securing the service which this monthly magazine provides, may procure it by sending fifty cents to the Superintendent of Documents, Government Printing Office, Washington, D. C.

Ideal Patients

A medical student was advised by an old doctor to specialize in skin diseases, because:

"The patients of a skin specialist do not call him in the middle of the night nor do they ask him to visit them at their homes. They don't telephone distress messages to the country club, and send telegrams to the football stadium. Finally, they never get well, but also they never die from a skin ailment. They are perfect patients."

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for March

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 10:00 A. M. every Monday over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

Speaker—William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

March 2—Asthma in Children.

March 9—The Parathyroid Glands.

March 16—Tonsils.

March 23—Cause of Anemia.

March 30—Dental Caries.

American College of Surgeons

The sectional meeting of the American College of Surgeons for the states of Nebraska, Iowa, Wyoming, North Dakota, South Dakota, Minnesota, Kansas and Colorado will convene at Omaha, March 11-13, 1936. The meeting will consist of operative and non-operative surgical clinics, conferences, exhibits and scientific sessions.

Members of the profession at large in the states concerned are cordially invited to attend the meeting. Dr. Herman F. Johnson, 831 Medical Arts Bldg., Omaha, Nebraska, is chairman of the local committee on arrangements.

State Meeting

Among the visiting speakers who have already consented to speak at the 83rd Annual Meeting of the Minnesota State Medical Association to be held at Rochester May 4, 5 and 6 are:

The distinguished Swiss physiologist, Dr. Leon Asher of Berne, Switzerland; Dr. Willis F. Manges, radiologist of Philadelphia; Dr. Elliott P. Joslin of Boston, who will read a paper on diabetes; Dr. F. A. Collier, Ann Arbor, and Dr. Donald Guthrie of Sayre, Pennsylvania, surgeons; Dr. Joseph A. Capps of Chicago.

Plans are under way, also, to secure Dr. Ferdinand Sauerbruch, chest surgeon of Berlin, to speak at the meeting and Dr. Max Cutler of Chicago. Dr. Sauerbruch and Dr. Asher are expected to come to Rochester to attend the sessions of the American Thoracic Surgical Society also, since the two associations are holding their meetings at the same time. It is hoped that Dr. Cutler will be present to deliver the annual Citizens' Aid Memorial lecture.

Dr. Manges will deliver the annual Russell D. Carman Lecture under the auspices of the Minnesota Radiological Society. Dr. Capps will come under the joint sponsorship of the Northern Minnesota Medical

Association and the Minnesota State Medical Association.

The program plan for the 1936 meeting calls for clinics each morning until 10:30 at St. Mary's Hospital. The rest of the meeting sessions and the exhibits will be held at St. Mary's Nurses' Home. A half hour each morning and afternoon will be devoted to the scientific and technical exhibits. The hours just before and after noon will be occupied by visiting speakers. Afternoons will be devoted to papers by Minnesota physicians.

One of the unusual features of the three-day program is the crime study session scheduled for Tuesday evening. Government experts in ballistics, finger printing and other aspects of the war on crime that are of especial interest to physicians will be there to address the doctors.

A meeting on Medical Economics will be held Monday evening. Speakers will include Dr. J. Tate Mason, Seattle, president of the American Medical Association, and Dr. Olin West, Chicago, general manager of the American Medical Association.

The Women's Auxiliary to the state association will also hold its annual meeting in Rochester at the same time. Fraternity meetings will be scheduled and golf is expected to occupy any spare time the doctors may find in between convention sessions.

Results of Questionnaire

Subjects scheduled for discussion at sessions of the 83rd Annual Meeting of the Minnesota State Medical Association to be held in Rochester May 4, 5 and 6 were selected on the basis of answers to questionnaires sent to members by the Committee on Scientific Assembly. Suggestions were received from 225 members.

It is interesting to note that the largest number of requests received were for discussions of sinusitis. Other subjects for which four or more requests were received include: endocrines, appendicitis, pneumonia, eczema, cataract treatment, prostate, fractures, immunizations, anesthesia and physiotherapy.

Amendment to Constitution

This is the third and final publication of the following amendment before it becomes an official part of the Constitution:

Article IV, Sec. 4.—Affiliate Members.

Affiliate members shall be those members of component medical societies:

1. Who through disability are unable to engage in the practice of medicine.
2. Who have retired from the practice of medicine.

Provided, however, that such member, in either class shall have first, upon his own request, been declared an affiliate member of such component society at its regular meeting, such action having been approved by the Council, and provided further, that such Affiliate Membership shall automatically cease and revert to its previous status upon the termination of the disability or upon the resumption of practice.

Nothing in this section shall in any manner invalidate an Affiliate Membership in good standing at the time of the adoption of this amendment.

Judd Lectureship

The Third Annual Lecture in the E. Starr Judd Lectureship in Surgery, established at the University of Minnesota by the late Dr. E. Starr Judd, will be given by Dr. Frank C. Mann, Professor of Experimental Surgery in the Mayo Foundation. The lecture will be held in the Music Auditorium on the University campus in Minneapolis on Tuesday, March 17, at 8:15 P. M. The subject of Dr. Mann's lecture will be "Hepatic Physiology and Pathology from the Surgical Viewpoint: A review of experimental investigations."

Minnesota Academy of Medicine

The Annual Meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, January 8, 1936. The president, Dr. Thomas S. Roberts, called the meeting to order at 8:10 p. m.

There were twenty-six members present.

The president announced that the reading of the minutes of the previous meeting and all other business could be dispensed with, and he would turn the meeting over to Dr. Hall, the retiring president.

DR. A. R. HALL, Saint Paul, addressed the Academy, choosing as the title of his Presidential Address "Hypoglycemia," giving special attention to its clinical manifestations.

R. T. LAVAKE, M.D., *Secretary*.

Minneapolis Surgical Society

The fourteenth annual dinner meeting, commemorating the anniversary of the foundation of the Minneapolis Surgical Society, was held under the presidency of Frederick A. Olson at the Minneapolis Club on the evening of February 6, and attended by 220 members and guests. Among the latter were W. J. and C. H. Mayo, to receive honorary memberships; D. C. Balfour, president of the American College of Surgeons; H. B. Zimmermann, president of the St. Paul Surgical Society; Karl Meyer, president of the Chicago Surgical Society, medical superintendent of Cook County Hospital and Regent of the University of Illinois; Harry Klein, vice president of the Duluth Surgical Society; Stanley J. Seeger, Milwaukee, immediate past president of the Wisconsin State Medical Association and president of the Alumni association of the Mayo Foundation; A. R. Metz, secretary of the Chicago Surgical Association and chief surgeon of the Milwaukee railway; W. A. Coventry, Duluth, president, and W. W. Will, Bertha, president-elect, of the Minnesota State Medical Association, with many others from Minnesota and surrounding states. The guest speaker was Frank L. Lahey, Boston, director of the Lahey Clinic, who gave a masterly address on his views and experiences in the diagnosis and surgery of carcinoma of

the colon and rectum. Vocal selections by a professional male quartet were interspersed between the various numbers and there was a short "Interval of Silence" in memory of two members, Arthur T. Mann and E. Starr Judd, who had passed away within the year. The evening was closed with the showing of motion pictures of outdoor life from *Field and Stream*.

Blue Earth County

All officers of the Blue Earth County Medical Society were reelected for 1936. They include: Dr. A. E. Sohmer, Mankato, president; Dr. Fred Franchere, Lake Crystal, vice president; Dr. Charles Koenigsberger, Mankato, secretary; Drs. E. W. Benham, Mankato, R. T. Edwards, Elysian, and H. J. Lloyd, Mankato, censors; Dr. A. G. Liedloff, Mankato, delegate, and Dr. M. I. Howard, Mankato, alternate.

WOMAN'S AUXILIARY

MRS. F. J. ELIAS, *President*, Duluth, Minn.
MRS. L. W. BARRY, *Editor, Press and Publicity*,
2193 Sargent Ave., St. Paul, Minn.

On January 27, 1936, a special meeting of the executive board of the Woman's Auxiliary to the Minnesota Medical Association was held in Saint Paul at the Commodore Hotel. This meeting was called by Mrs. F. J. Elias, president, to honor Mrs. Rogers N. Herbert of Nashville, Tenn., president of the Woman's Auxiliary to the American Medical Association. Mrs. Herbert reviewed the activities of the national group at the session of the state executive group held in the morning. At noon she was guest of honor at a luncheon given for members of the state board and also for members of the Hennepin and Ramsey County boards. Mrs. Elias presided and introduced the speakers, Dr. R. M. Burns and Dr. A. G. Schulze. In the afternoon Mrs. Herbert and Mrs. Elias were honored guests at a delightful tea given by the Auxiliary to the Ramsey County Medical Society, of which Mrs. J. J. Ryan is president. Mrs. Herbert was the house guest of Mrs. James Blake, Hopkins, Minn. Mrs. E. M. Hammes, president-elect of the State auxiliary, entertained at luncheon in honor of Mrs. Herbert, Mrs. Blake and Mrs. Elias on January 28.

In spite of the extreme cold, Mrs. J. F. Norman, Crookston; Mrs. A. C. Baker, Fergus Falls; Mrs. R. J. Josewski, Stillwater; Mrs. J. A. Thabes, Sr., Brainerd; Mrs. W. J. Ryan, Duluth; Mrs. James Blake, Hopkins, and several from points not quite so distant attended the meetings. A nominating committee was elected and will present their slate at the annual meeting to be held in Rochester, Minn., on May 4, 5 and 6, 1936. All members are urged to attend this meeting.

* * *

The *Auxiliary to St. Louis County Medical Society* has been carrying on in its usual active way. A dinner dance and bridge party were recently sponsored and enjoyed.

Hennepin County Auxiliary members, at a recent meeting, heard an interesting talk on "Medical Economics" given by Dr. Wm. B. Roberts of Minneapolis.

* * *

On February 11 *Ramsey County Auxiliary* sponsored a double header bridge party—one in the afternoon and one in the evening. Mrs. Herman Kesting, general chairman of the Ways and Means Committee, and Mrs. E. G. Sterner, vice chairman, assisted by a large committee, were responsible for a most enjoyable afternoon and evening to many members and their husbands. The event netted a considerable amount which will be added to the Philanthropic Fund.

* * *

The *West Central Medical Auxiliary* reports the following as their officers for the year: Mrs. Herman Linde, Cyrus, president; Mrs. E. T. Fitzgerald, Morris, vice president; and Mrs. E. M. Elsey, Glenwood, secretary and treasurer.

* * *

Mower County Auxiliary reports monthly on their meetings. While their attendance is only fair, they spend their time in a profitable way—folding dressings for the hospital at Austin.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES. For the Fiscal Year 1935. 158 pages. Illus. Price, 75c cloth. Washington, D. C.: Superintendent of Documents, 1935.

THE PSYCHOLOGY OF DEALING WITH PEOPLE. Wendell White, Ph.D., Asst. Professor in Psychology, University of Minnesota. 256 pages. Price, cloth, \$2.50. New York: The MacMillan Co., 1936.

DISEASE AND DESTINY. Ralph H. Major, M.D., author of "The Doctor Explains," etc. 338 pages. Illus. Price, cloth, \$3.50. New York: D. Appleton-Century Co., 1936.

PHARMACOPOEIA OF THE UNITED STATES OF AMERICA. Issued by authority of the United States Pharmacopoeial Convention. 676 pages. Price, leather \$6.00, cloth \$5.00. Easton, Pa.: Mack Printing Company, 1936.

COMMON CONTAGIOUS DISEASES. Philip Moen Stimson, A.B., M.D., Assistant Professor of Clinical Pediatrics, Cornell University Medical College, Visiting Physician Willard Parker Hospital, etc. 537 pages. Illus. Price, flexible binding, \$4.00. Philadelphia: Lea & Febiger, 1936.

YOU MUST EAT MEAT. Max Ernst Jutte, M.D., Formerly Lecturer on Stomach and Intestinal Diseases, New York Polyclinic Medical School, etc. 164 pages. Illus. Price, cloth, \$2.00. New York: G. P. Putnam's Sons, 1936.

BLOOD GROUPS AND BLOOD TRANSFUSION.

Alexander S. Wiener, A.B., M.D. Chas. C. Thomas Co., Baltimore, Maryland, 1935.

Dr. Weiner, in *Blood Groups and Blood Transfusion*, adequately accomplishes his avowed intention of presenting "the important known facts concerning individual differences of the blood . . . in a manner which will make the subject readable . . . but without sacrificing completeness of exposition." This monograph, utterly lacking in pretension, simply and directly presents an amazing amount of material in readily digestible form. The major information is conspicuously practical, as suggested by such chapter sub-titles as "Sources of error in blood grouping," "Indications for and reactions to blood transfusion," "Technic of blood transfusion" and "Medicolegal applications of blood grouping." In the section on forensic medicine, well-selected case histories effectively illustrate the points of practical interest. In all, these sections should particularly appeal to those persons seeking general knowledge in this field.

For those interested in the laboratory, there is adequately detailed information concerning technic to make reference to original sources unnecessary. If for no other reason, the resultant economy in time should make this treatise a part of every completely equipped laboratory. In contrast with monographs of similar scope, the bibliography is limited, but obviously select. There is no sacrifice of pertinent material; to the contrary, moot questions are only briefly indicated. This obvious and admitted bibliophobia, to coin a term is quite commendable, and adds to, rather than detracts from, the attractiveness of the style of the publication.

However, the author does not ignore his more erudite readers, for the sections on genetics with a application of the biometric method shows that he is not lacking in that quality. Even this more or less complex and abstruse material is effectively treated in that uniquely direct manner that typifies the whole of this treatise.

HARRY AGRESS, M.D.

CLASSIFIED ADVERTISING

SPACE OR HOURS available in well equipped office in Medical Arts Building, Minneapolis. Address D-32, care MINNESOTA MEDICINE.

FOR SALE—Minnesota Twelve Thousand Dollar Practice, including one-half interest in x-ray, diathermy, Hanovia lamp, instruments, splints, furniture. Population 2,000. Best medical center in state. Op hospital. Address D-316, care MINNESOTA MEDICINE.

THE RESPONSIBILITY OF THE GENERAL PRACTITIONER IN THE TUBERCULOSIS PROGRAM OF THE FUTURE*

F. M. POTTENGER, M.D.

Monrovia, California

Present Status of the Antituberculosis Program

TUBERCULOSIS studied from the mortality tables of the past quarter of a century might be considered as fast approaching a position of secondary importance in the family of infectious diseases.

From a death rate for all ages of 200 per hundred thousand population in the United States in 1900 the rate has declined to about 50 per hundred thousand today. But this fails to tell the full story, for, while the average number of deaths of all ages is in the neighborhood of sixty, the death rate for males between the ages of twenty and sixty-five runs from 100 to 165 per hundred thousand population; and of females from the age of twenty to fifty-five it drops from 140 to seventy-five per hundred thousand, to rise again to 130 per hundred thousand at the age of seventy years. This high mortality during the productive period of life still makes tuberculosis one of the greatest foes to the human race.

The situation is most gratifying if we compare only the mortality for all ages now with that of 1900; but it is distressingly unsatisfactory when we see that the death rate during the productive period of life is still so near the rate which held for the average of all ages in 1900. This enormous loss among the young adult population during the period of greatest usefulness stands as a special challenge to those who are intimately connected with the antituberculosis campaign.

*The John W. Bell Lecture on Tuberculosis, under the auspices of the Hennepin County Tuberculosis Association and the Hennepin County Medical Society, Minneapolis, Minnesota, December 2, 1935.

The reduction in mortality which has taken place has been produced by many factors, but the cause may be summed up in the one word "knowledge." Tuberculosis took its toll throughout the ages because of the lack of knowledge of its cause, and the lack of knowledge of how to live. Its seriousness has been reduced by scientific medical discoveries which have already, in half a century, permitted an effective curative and preventive regimen to be established. This program based on our newer knowledge has made use of the services not only of the medical profession but of nurses, social workers, health boards and sanitary engineers.

We have now reached a milestone. The entire civilized world is now cognizant of the nature of tuberculosis. Probably never before in so short a period of time has so serious a problem been advanced so far on the way to its solution. The method of attack from now on must be more specifically directed to the problem of prevention if we wish to continue the progress which has been so satisfactorily started.

Curative and Preventive Measures Present Different Points of View

When it was established that tuberculosis was a curable disease our attack became at once a clinical one. A corps of specialists developed whose major efforts were put forth to cure the disease. Prevention was secondary, largely because its possibility of accomplishment was not grasped. But as time passed and knowledge of the disease became greater, cure and prevention received equal attention but from different agencies: cure from the clinicians and prevention from health authorities. Today, another change

is forcing itself upon us and the entire force of tuberculosis workers has become prevention-minded and prevention has become the slogan of the antituberculosis campaign. Prevention, fortunately, demands treatment for the patient who is ill as well as measures for preventing the spread of infection.

Cure of the disease is receiving more attention than ever before, and our methods of treatment are becoming more and more effective, yet there is a sentiment, which is rapidly growing, to the effect that the rights of a patient are secondary to the rights of society, and there is a fast-growing tendency to relegate cure to second place in our program.

This point of view is that of public health as contrasted with clinical medicine. It has been arrived at, not because the rights of patients do not appeal to the tuberculosis crusaders but because of the necessity of meeting the problems of treatment as well as prevention with facilities which are inadequate. There are not now, nor are there likely to be in the near future, facilities for caring for all who suffer from tuberculosis and affording them opportunity to secure the best possible chance of cure; so the plan of treating tuberculosis with the facilities which are available and of giving aid to as many patients as possible, while increasing the efforts at preventing open cases from being sources of spreading infection, has been adopted in certain places as offering, not the ideal, but the best and most practical method under present circumstances.

Could all cases of active tuberculosis be put under treatment at the time that the disease first manifests itself, in an adequately equipped sanatorium, and be kept there until the best possible results were attained, comparatively few would fail to secure an arrestment of their disease. However, such a program would require an expansion of sanatorium facilities to several times the present bed capacity and an immediate outlay of money so great that governments could not be induced to follow the program, no matter how efficient it might seem to be, and no matter how much it would save in dollars and cents by the reduction of new infections and by restoring patients to economic usefulness. Even the amount that may be saved in lives and money by utilizing our present facilities to full advantage is almost beyond belief. The possibilities

of accomplishment under such a plan call for careful discussion that they may be understood and approached if not attained.

The chief point in such a program is not only the earliest possible diagnosis but also the earliest possible application of adequate treatment and the institution of effective measures for preventing others from becoming infected; or, if infected, from becoming ill of the disease. Such a program depends on the medical profession and principally on that part of the profession which is not actively engaged in tuberculosis work, for it is the general man whose advice is usually sought first and then the advice of the specialist follows.

An efficient antituberculosis force to carry forward the program of today would make the general practitioner the key man; so it can not be without interest to discuss the part which he must play in furthering the control of tuberculosis, and the manner in which he may do it. Tuberculosis is a preventable disease, and the family physician has an important part in its prevention; it is a curable disease and he has an important part in its cure. He must first know his part and then assume it.

In the first place he must be prepared to suspect tuberculosis when a case presents itself; and must be able to diagnose it when he suspects it. To do this he must be tuberculosis-minded. He must be expecting it the same as he expects pneumonia, syphilis, heart and kidney disease, or diseases of metabolism. He furthermore must have confidence in his ability to do the part which he assumes.

Prior to the last few decades tuberculosis was considered to be a hopeless disease, and it is no wonder that the medical profession treated it as a stepchild. But this has changed. Tuberculosis, today, is not only known to be curable but it is known to be the most curable of the chronic diseases. In order that it may be cured however, the diagnosis must be early and the treatment must be immediate and adequate. There is nothing magical in its diagnosis. Any physician who has graduated at a reputable medical school in recent years should be able to make a diagnosis in nearly all patients when they first seek his advice, by applying the methods which time has shown to be the most efficacious. He should not only know the relative value of the individual symptoms but he should be able to

interpret them as they manifest themselves in various combinations.

Tuberculosis Presents Different Modes of Onset

Tuberculosis may be ushered in precipitately, the patient passing from a condition of health to one of severe illness in a day's time. This is the acute exudative type which produces a widespread tuberculous pneumonia. Again, it may be months or years in developing without the patient's knowledge. Most cases lie between these extremes, the onset of activity being marked by a moderate reaction on the part of the body to a moderate dose of invading bacilli, coming from either an endogenous or exogenous source.

The beginning of activity in tuberculosis of the lung may simulate other diseases, varying with the particular syndrome which is present. The onset is often spoken of as being of distinct types, thus the "neurasthenic" type when mildly toxic; "bronchitic" type when repeated or persistent cough or colds are the principal feature; "pneumonic" type when a widespread exudative infiltration takes place because of the marked hypersensitivity of the tissues; "circulatory" type when dyspnea and unstable heart action dominate the picture; the "gastro-intestinal" type when lack of appetite with nausea and probably vomiting are present; the "hemorrhagic" type when the disease makes its presence known through the spitting of blood; and the "pleuritic" type when pleural pain or effusion are the dominant signs of bacillary activity.

It will be noted that nearly one-half of these syndromes, the "neurasthenic," the "circulatory," and the "gastro-intestinal," call attention away from the lungs, because the symptoms are either of a toxic nature or are reflexly produced in other organs. Fortunately, other reflexes will usually be present which will call attention to the lung, as the probable source.

Etiologic Classification of Symptoms of Tuberculosis

While I do not wish to be too elementary, yet I may be pardoned if I discuss the importance of a clinical history, because a carefully taken history will usually furnish the data on which a presumptive diagnosis may be based. History taking is a symptom-eliciting process. It discovers the complaints of the patient and other departures from normal.

Symptoms are disturbances in physiologic action. If one will carefully examine the symptoms which are present in active pulmonary tuberculosis, he will see that they fall etiologically into three natural groups: those caused by toxins; those of reflex origin; and those produced locally by the lesion in the lung—systemic, reflex and local. Arranged in tabular form they are as shown in the accompanying table.

If only one understands the different manner in which these three groups of symptoms are produced, it will aid him greatly in not only diagnosing tuberculosis, but in determining the degree of activity which may be present.

Let it be understood that the toxic group is in no way specific for tuberculosis. The same group of symptoms may be present in any infection such as measles, whooping cough, pneumonia, typhoid fever, or diphtheria; varying only as the causative toxins vary and as different individuals vary in their reaction to the toxic substances.

The toxic substances which cause this group of symptoms act upon cells throughout the body. They not only disturb cell activity generally but they particularly affect the two great correlating systems of body activity, the nervous system and the endocrine glands. Therefore, they are spoken of as systemic symptoms.

When symptoms of severe toxemia are present there is no difficulty in diagnosing the presence of an infection; but those of a mildly active tuberculosis not infrequently are to be differentiated from neurasthenia, psychasthenia and conditions of hypo- or hyperaction in some of the endocrine glands; the picture being that of general physiologic imbalance.

Tiredness, lack of strength and endurance, capricious appetite with fluctuations in weight, rapid or variable pulse, insomnia and general nerve instability are common to many of these states; and since hyperthyroidism and some of the conditions of nerve imbalance may disturb the heat mechanism and produce slight elevations of temperature, differentiation is sometimes difficult.

The toxic symptom which is easiest of recognition by the physician is elevation of temperature. The ones which disturb the patient most are probably fever and tiredness. One must bear in mind that the elevation of temperature is due to the body's reaction to a new invasion of

bacilli or the absorption of focal products. It may last as long as the body is called upon to react. Sometimes this is only a few days; other times it is continuous week after week and month after month. Sometimes fever and other symptoms of toxemia disappear after a few days. Then it may be difficult to make the patient realize that he is ill. He attributes the illness to a temporary cause. It is also confusing to the medical man unless he knows this peculiarity in symptomatology of a chronic infectious disease like tuberculosis. A patient may be toxic today, have elevation of temperature, complain of tiredness, aching, rapid pulse, loss of appetite and loss of a few pounds in weight, and next week may be free from all evidence of toxemia and be on the way to regaining his weight. This peculiar nature of mild tuberculous reactions must be understood by all physicians who expect to effectually deal with tuberculosis. So must the premenstrual rise in temperature, which may be present for the fourteen days preceding menstruation, or any part of that time, be held in mind. Not infrequently the normal premenstrual temperature will reach 99° and occasionally 99.6° , which may be quite confusing if other symptoms suggestive of tuberculosis are present.

Were the toxic group of symptoms the only ones on which to base a diagnosis, little, if any, suggestion of the location of the lesion would be given. Fortunately, however, symptoms of a reflex nature, at least irritation in the larynx and cough, usually accompany the toxic symptoms; and not infrequently one or more of the local group. It is not any one or two symptoms on which tuberculosis usually is suspected but some combination of representatives of the three etiological groups.

Toxic symptoms with cough and expectoration, if they persist longer than those of an acute cold, sinus infection or bronchitis, suggest tuberculosis, but the diagnosis is made only after using other methods of examination. Combinations, such as tiredness, temperature and cough; temperature, pleurisy and loss of vigor; spitting of bright blood alone or in combination with symptoms of a reflex and toxic nature, are usually suggestive of tuberculosis.

While toxic symptoms may be caused by tuberculous poisons being absorbed from any part of the body, and so have no localizing significance, irritation of the larynx, hoarseness and cough, should any one of these be present, would

at least call attention to the respiratory tract; and flushing of the face, if present, would further increase the probability of the lung being the source of the irritation which is responsible for the reflex.

Hemoptysis; pleurisy, dry or moist; and sputum are the symptoms which particularly localize the lesion in the lung, even better than the reflexes. These are the most important diagnostic symptoms of pulmonary tuberculosis. If the sputum contains bacilli, of course the diagnosis is made.

Symptoms of the toxic group, combined with one or more local symptoms, nearly always make the diagnosis of a lung or pleural lesion probable. If the local lesion be pleurisy, and it is not accompanied by pneumonia, influenza, or trauma, it is usually of a tuberculous nature.

It will now be evident that three forces only are active in disturbing the patient's physiologic equilibrium, and causing the twenty or thirty well recognized symptoms which we may meet in active tuberculosis. If the disease is mildly active, the symptoms are mild; if markedly active, they are severe.

The body cells of different individuals react differently to irritations, which accounts for different groups of symptoms being present in different patients in the presence of what seem to be similar infections. This fact must be taken into consideration in studying every patient in the presence of every disease. It is simply a way of saying that the physiologic balance of different patients differs.

This difference in physiologic balance holds for reflex symptoms as well as for those of a toxic nature. One person will be greatly perturbed by digestive and cardiac symptoms, by throat discomfort of a reflex nature and by cough, while another will show little departure from normal function in these organs.

The reflexes are caused by the inflammation in the lung irritating the endings of sensory pulmonary nerves which transmit the impulse centralward and produce reaction in motor nerves whose cell bodies lie adjacent in the central nervous system.

Group II shows the more common reflexes. I have suggested and described some forty reflexes which may be produced by inflammation in the lung. Some of these are of diagnostic import, some are not; some require therapeutic attention; others cause no serious disturbance.

TUBERCULOSIS PROGRAM OF THE FUTURE—POTTENGER

ETIOLOGIC GROUPING OF COMMON SYMPTOMS OF PULMONARY TUBERCULOSIS

GROUP I Symptoms Due to Toxemia	GROUP II Symptoms Due to Reflex Cause	GROUP III Symptoms Due to the Tuberculous Process <i>per se</i>
Malaise	Hoarseness	*Frequent and protracted colds (tuberculous bronchitis) Spitting of blood Pleurisy (tuberculosis of pleura) Sputum with or without bacilli
Lack of endurance	Tickling in larynx	
Loss of strength	Cough	
Nerve instability	Digestive disturbances which may result in loss of weight	
Loss of appetite	Circulatory disturbances	
Digestive disturbances (hypomotility and hyposecretion)	Chest and shoulder pains	
Metabolic disturbances resulting in loss of weight	Flushing of face	
Increased pulse rate	Spasm of muscles and shoulder girdle and crus and central tendon of diaphragm	
Night sweats	Diminished motion of affected side. Lagging.	
Elevation of temperature	If chronic, degeneration of apical soft tissues	
Anemia		
Leukocytic changes		

*Strictly speaking, "colds" should not be treated among the symptoms; for the "cold," as so often described, is a syndrome of acute spread of infection; a large re-inoculation with tuberculo-protein; or caseation and cavitation.

There is no subjective reflex that is always present—not even cough; nor is there anything in the reflex group which definitely indicates tuberculosis. This group, however, if one understands reflex relationships, does locate the lesion in the lung; because the reflexes, particularly those which are caused through the afferent fibers which course with the sympathetic system and efferents which supply skeletal structures, are located in definite structures, for each organ. Thus the heart reflects principally through the upper three thoracic nerves which supply the inner side of the arm and the upper portion of the chest on the left side; the stomach over the lower chest and the upper abdominal wall on the left; and the lungs in the muscles of the shoulder girdle, diaphragm, and the skin and subcutaneous tissue above the second rib anteriorly and above the spine of the scapula posteriorly. So it may be seen that these reflexes have localizing significance.

The symptoms of Group III are the most important because each symptom is caused by the tuberculous process *per se* in the tissues. The inflammation may irritate nerves and cause an increase in secretion or cause the tissues to undergo caseation and liquefaction and produce bacillus-bearing sputum; it may be situated im-

mediately under or in the pleura and cause pleural pain or an effusion; or it may involve a blood vessel and cause bleeding.

"Cold," which we classify as a symptom of tuberculosis because of the frequency with which it is present, in reality is a syndrome of immunity reaction, and while the effect is a local one it is expressed by the presence of symptoms of each group.

It will be seen that the inflammation in the lung is the direct cause of both local and reflex symptoms; and, quite frequently, symptoms of both groups are present. The symptoms of the toxic group being caused by the poisons which generate as a result of the growth and destruction of bacilli and the destruction of pulmonary tissue, while produced not by the inflammatory process but the poisons originating in it, are of added weight when present.

By analyzing symptoms according to their etiology few cases of frank tuberculosis will escape without being suspected.

When Tuberculosis is Suspected, How is the Diagnosis to be Determined?

Tuberculosis is suspected from the history which the patient gives of his illness. If tuberculosis is suspected, how will the physician pro-

ceed to make the diagnosis? There are two things that he should always do. He should have any sputum that may be present carefully examined, and he should have an x-ray taken.

I do not wish to deny him the use of other methods of examination. He should make a physical examination of every chest which is suspicious of tuberculosis; but, knowing the difficulty which one not accustomed to examining chests meets in making the diagnosis of tuberculosis by the usual procedure of physical examination, it is much better for the general man to have other measures upon which he may place his dependence.

He may rely on being able to make a correct diagnosis in fully eighty per cent of patients suffering from tuberculosis at the time when they first consult him by carefully taking a clinical history and analyzing the symptoms; by taking an x-ray; and by examining whatever secretion is coughed up. This leaves only about twenty per cent of cases in which there would be doubt, the so-called borderline cases which often require repeated examinations and careful study before the correct diagnosis is made.

A word of caution is necessary in regard to both the x-ray and the examination of sputum. Simply an examination of sputum and the taking of an x-ray is not sufficient.

The sputum must be collected properly and examined carefully in order to be of diagnostic value. In those cases in which the sputum is scant and the bacilli are rare there is great danger that the bacilli may not be found, though present. It must be remembered that the usual plan of taking a sample of the sputum coughed up and subjecting it to the ordinary Ziehl-Neelsen method of staining will prove inaccurate in many early cases.

It has been shown that about 100,000 tubercle bacilli per cubic centimeter of substances must be present in order for them to be found by this method, while the collecting of the entire amount of sputum for two or three days, and treating it by one of the concentration methods, will increase the efficiency many fold. J. E. Pottenger's dilution-flotation picric-acid method reveals bacilli when less than a thousand are expectorated in twenty-four hours. In comparing a large series of specimens showing rare bacilli, the findings with this method and guinea-pig inoculation have proved to be very close in their

relative accuracy, with the advantage for the examination because a report may be had in two hours' time.

It is important for physicians to know of this inaccuracy in the examination of sputum, otherwise, in suspicious cases they may be overawed by the laboratory's failure to find bacilli when, from the clinical history and other methods of examination, they strongly suspect tuberculosis to be present. When a definitely destructive process is present and sputum is present in fairly large quantities, the more simple method is usually sufficiently reliable, but in cases of scant sputum, too much reliance can not be placed in it.

In a suspicious case, if bacilli are found, the diagnosis is made; but if not found, even after concentration methods are used, then the patient should be kept under surveillance and re-examined at frequent intervals until the diagnosis is definite; or, what is better, a consultant, who specializes in chest diseases, should be called in to assist in making the diagnosis and to share the responsibility.

While examination of sputum may give much or no information, an x-ray, if properly taken and read by one experienced in reading plates of tuberculous chests, should furnish valuable diagnostic aid in nearly all instances. The x-ray is not absolute, however, but its value is truly great. Now and then we find symptoms of tuberculosis and rare bacilli present in the sputum when the x-ray shows nothing definite in the lung parenchyma, and we assume that the open lesion must be lost in other shadows such as those of the hilum and bronchial tree, or those of dense scar in the shadow of pleural effusion, should such be present.

In the average case, however, a good plate, a painstaking examination of sputum, and a satisfactory history will furnish sufficient evidence on which the general practitioner can make a correct diagnosis. In this day, when x-ray and clinical laboratories are practically always at his command, he should become fairly bold in assuming the responsibility that is his in the diagnosis of this disease, at least in all frank cases.

One caution, however, is necessary. He must be interested in making the diagnosis and must have confidence in his ability to do it, before assuming a responsibility which is of so great importance to the patient.

Physical Examination of Patient

Inspection, palpation, percussion and auscultation should always be utilized because they give some information even to those who do not possess great skill and they aid in securing the confidence of the patient—a thing greatly needed when dealing with a serious disease like tuberculosis. So often patients report to me that their former physician did not even listen to the chest, but made the diagnosis with the x-ray. They never feel quite satisfied without being examined physically.

In order that the general man may suspect tuberculosis, I wish to call his attention to a sign which was described by me more than twenty-five years ago which, when present, will suggest to the examiner that some chronic inflammatory lesion is, or previously has been, in the lung of the patient. I refer to the reflex degeneration of the soft tissues over the pulmonary apices.

This is often so plain that one patient notes it on another's chest. One of my patients, a few days after hearing me describe this to a visiting physician while examining her, brought her sister to me for examination, saying that she was sure she had tuberculosis because she had degeneration of the skin and subcutaneous tissues above the second rib on her left side. Examination revealed a predominantly proliferative lesion in the upper third of the left lung, and her history indicated that it had been present and active for some time. This is a sign that any physician could recognize if it were once pointed out to him.

Practice in inspection will reward any physician for his pains by giving him an important clue as to what has taken place in the past in the chest of a given tuberculous patient. This sign can also be found by palpation. The tissues which are degenerated lose their normal elastic feel and become doughy, and the subcutaneous tissue wastes and becomes thinner than the normal for that individual as determined in adjoining areas.

It is not necessary for the general practitioner to burden his mind with all the details of how this is produced, but it is of great value to him as a diagnostician to know that when he sees a wasting of the soft tissues above the second rib, anteriorly, and above the spine of the scapula, posteriorly, that this is in the area in which the

lung produces its trophic reflex, and further that the degenerative changes indicate that the disease has existed for some time; at least months. In fact, it may be healed, but if the patient is showing suspicious symptoms, it offers a localizing bit of evidence of where disease has been in the past and where it may be suspected now.

Old healed lesions may cast doubt on the value of this reflex to one who has not followed tuberculosis carefully, for it is not uncommon for a lesion, particularly a predominantly exudative lesion, to be present sufficiently long to cause degeneration and then to heal so completely that an x-ray may fail to give any idea of its extent when it was in its acute state. However, regardless of this confusing fact, should general medical men recognize this localized degeneration, it would be to them a sign of inestimable value.

The motor reflexes in the muscles of the shoulder girdle, too, are of great diagnostic value but more difficult to determine.

The General Practitioner's Part in Treatment

On a diagnosis of active tuberculosis being made, it is important for the practitioner to know what to do in order to carry out his obligation to the patient. A situation arises here which is just as serious as that met when an appendicitis, a diabetes, or a heart lesion has been discovered. The physician must be certain in his instructions. The right course leads to an improvement or cure, while a wrong one permits the disease to extend and injure the patient's future usefulness or even destroy his life.

Can the general practitioner successfully treat a patient suffering from active tuberculosis, and is the patient justified in depending upon him in so serious a disease? With the lack of interest which the general profession has taken in tuberculosis in times past, and even in the present, this question can be answered in the great majority of instances with an unqualified "No." But the past and present should not control the future. Every practitioner of medicine who has graduated in recent years should be familiar with the methods of diagnosis and the measures used in treating tuberculosis. If he assumes the responsibility of protecting the health and lives of the people who consult him, he should make no exception in tuberculosis. He should familiarize

himself with the facts which he must know about tuberculosis, and take the same interest in it that he takes in other diseases.

It is necessary to fully appreciate the fact that when a diagnosis of early active tuberculosis is made the patient's chances of recovery are good if intelligently treated, but are very doubtful if wrongly treated. The prognosis in early active tuberculosis is nearly as good as in acute appendicitis, if both patients receive the benefits of well established treatment. If neglected, it is as apt to extend and bring about as serious a situation as acute appendicitis. The difference is that months and probably years intervene between the first symptoms and serious illness and death in tuberculosis, while hours or days only intervene in appendicitis. The lapse of time does not change cause and effect, but clouds the relationship.

A patient with an acutely active tuberculosis can not go about his business, even though his temperature is normal, without jeopardizing his chances for life. This must be clearly understood by any one who would treat tuberculosis.

Every physician who accepts the responsibility of treating tuberculosis should understand the importance of rest, and be familiar with the technic of its application. Even though he may intend to refer his patient to a specialist for care, as soon as a diagnosis has been made he should put the patient on bed rest, using his judgment only in deciding whether or not the patient is to have bathroom privileges. Unless the patient is very ill I would not deny this.

The patient should be given a nourishing diet, kept in a well ventilated room, given all the optimism that present methods of treatment warrant, and be protected from long, tiresome visits and disastrous advice of well-intending friends. He should be seen frequently by the physician in order to be sure that the program as laid down is being carefully followed, to change it as conditions arise which call for change, and further for the purpose of keeping constantly before the patient the fact of his curability. It is a time when the philosophy and psychology such as was possessed by the old "family physician" comes into play.

If the physician has fitted himself to treat tuberculosis, and conditions warrant his doing it in a given instance, he should then establish a regimen which is to be followed religiously—not

for a week or a month—but for months. If he has not prepared himself to do so, however, he should refer the case at once to some one who is qualified to apply modern methods of treatment to best advantage. Time is the essence of the contract. Delay is costly in time, money, future efficiency and often in life.

The General Practitioner's Part in Prevention

The family physician also must assume the responsibility of preventing the spread of infection and the developing of the disease. As soon as open tuberculosis is discovered, the patient must be instructed how to prevent infection of others. He must be told of the necessity of destroying all sputum or other discharges; he must be instructed in personal hygiene, the care of the mouth, the importance of avoiding soiling his hands, clothing and bedding with infectious material; the part that sunshine and open air have in reducing infection, and his duty towards those who must care for him.

The physician owes a debt to those who have or must continue to live in the same house. They must be instructed how to avoid infection. Children should be kept from the room and, better still, should be removed from the house. They are most susceptible to infection. Practically every child who lives in the same house with an open case of tuberculosis for any length of time, becomes infected; therefore, if possible, removal should be made as soon as a diagnosis is made.

The family physician can do more than this. He should find out whether or not the other members of the family are already infected. This can be done by the simple tuberculin test. This is a test that every physician should know how to give. There is nothing difficult in its administration or its reading. A sharp needle and the preparation of tuberculin to be used, and an understanding of the dosage and technic of injecting it between the layers of the skin is all that is necessary in its administration, and then seeing the patient twenty-four, forty-eight and probably seventy-two hours afterwards, to see whether an induration indicating positive reaction has appeared and to study the course which it follows, are the requirements for completing the test.

Should a positive reaction be found, then it is known that infection has already taken place.

The source of the infection, however, is not indicated; for we are often surprised to find an infection in children where there has been no immediate contact. Therefore, it seems to me to be bad psychology and bordering on cruelty to tell a mother or father, or a sister or brother, that he or she has infected other members of the family. It is better to tell them that it might be so, but leave the matter uncertain so as to give the patient the benefit of the uncertainty. Such escape is due any conscientious patient who may have unknowingly exposed other members of the family. However, in case the patient is wilful and unwilling to take precautions, then the physician might be less considerate.

The physician must be able to explain to the anxious relatives the meaning of primary infection. While primary infections are common and probably present in nearly half of our city children, the number that will break down with active tuberculosis is very few. Infection and disease are two very different conditions. The knowledge of the presence of infection may be used in the interest of reactors to prevent them from becoming actively diseased.

Knowing of the presence of a primary infection, it is the duty of the physician to see that the infected individual maintains a high standard of health until the lesion is healed. At the first indication of a failure to maintain normal health, the possibility of an extension of the known tuberculous infection should be thought of, and the individual should be subjected to re-examination, and to treatment if active disease is found.

Conditions which should serve as danger signals are a stoppage of development, tiredness, nervousness, lack of desire to play, and lack of appetite, in an infected child; while in an adult, it would be some of the syndromes which have previously been mentioned as indicating early tuberculous infection. A chest plate of such patients should be immediately taken, and, if a parenchymal lesion is found, treatment should be at once instituted. This condition, contrary to the usual primary infection, must not be considered simple and inconsequential, for it is apt to be the beginning of a serious disease. Treatment at this time may be compared to operating on appendicitis when the first symptoms develop. It save the patient's life and in case of tuberculosis spares him a long-drawn-out and costly illness.

As we face the future we visualize the general practitioner taking a much more intimate part in the tuberculosis program than heretofore. I have endeavored to point out what this part may be, and to assure him that a very dignified position awaits him in which he may become the chief diagnostician; the one who decides who shall treat the patient and where the treatment is to be carried out; the one who must apply preventive measures in case of open tuberculosis, to check the spread of infection, and the one who should apply the tuberculin tests to locate infection, and to prescribe the course to be followed in case it is present. A whole-hearted cooperation on his part should insure a continuous decline in the morbidity and mortality from this disease.

CHRONIC MYOCARDIAL DISEASE*

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THE subject of chronic myocardial disease was selected because of its increasing importance to the general practitioner, as well as to the cardiologist. The disease is definitely on the increase, and now heads the list of the diseases causing death and disability in middle age and advanced life. About 60 per cent of the cardiac diseases that the general practitioner sees is of

this type. The term is now used by the leading clinicians to include or displace such terms as "chronic myocarditis," "chronic cardiac fibrositis," "chronic myocardial degeneration," and "chronic hypertensive heart disease." This term includes all those forms of cardiac disease that show failure of the myocardium to perform its function properly. Valvular disease, syphilis, thyrotoxicosis, and congenital heart defects, of course, are not included.

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The etiology of this disease is still somewhat obscure. Infections of early life and the onset of arterial hypertension in early middle life undoubtedly form important etiological factors. The social conditions under which business and professional men of today live are undoubtedly also contributory factors. The early beginnings of these cardiac changes are seldom recognized. We are familiar only with the later manifestations, and are called on to deal chiefly with corrective measures after the damage to the heart has fully developed.

The symptoms of chronic myocardial disease are varied, but the constant manifestations in all forms are hypertrophy and dilatation of the heart, with consequent interference with many of the normal functions of the heart. Christian calls attention to the fact that a narrowing of the lumen of the retinal arteries is a very constant concomitant finding. Coincident states, either as causes or sequelæ, are coronary disease, advancing arteriosclerosis, engorgement of the liver, kidneys, and lungs, and a disturbance of the proper functioning of the entire circulatory system. The subjective symptoms begin insidiously with easy fatigability, and dyspnea after exertion which does not clear up normally after a period of rest. Cough, cyanosis and orthopnea with symptoms of decompensation are later manifestations.

It is useless for me to attempt to summarize the pathological findings in this disease. Investigators such as Christian and Cabot have been greatly puzzled in their postmortem findings in a great many of these cases. Many, of course, show changes in the coronary arteries, fibrous degeneration of the heart muscles in certain areas affected by coronary occlusion, and sometimes a form of fatty degeneration, or cloudy swelling of the muscle cells. They find, however, that a great many of these hearts show nothing but extensive or massive hypertrophy

and dilatation with no evidence of inflammation or degeneration in any part of the structure. It is evident that the unknown factors causing these changes have also contributed to a generalized interference with the entire vascular system. The development of massive tissue in the heart evidently interferes with its physiological function as a pump. The progressive deterioration of the circulatory system brings invalidism and finally sudden or gradual exodus.

The problem of treatment is too well outlined in the voluminous medical literature on the subject, for us to consider in this brief paper today. Digitalis for decompensation, salyrgan or similar mercurials for edema, theobromin derivatives for arteriolospasm, and morphine for orthopnea—all are among the best recognized measures for relief. Now comes enthusiasm for a new procedure—the total ablation of the thyroid. We hope that this is not simply another over-emphasized innovation. Reports are quite encouraging. We grasp at anything that promises relief for these suffering invalids, and we are often deeply disappointed with their inefficacy.

The problem of the future in the prophylaxis or cure of this disease ranks in importance with that of cancer and tuberculosis. We have not given enough attention to its prevention. The value of periodic health examinations cannot be too strongly emphasized. Better instruction for the medical student and the general practitioner in the use of cardiac function tests, and in the recognition of the early signs of myocardial failure must be stressed. Public health organizations must stress to their public the essentials of proper living conditions, and strive to prevent this disease that disables individuals in the prime of life. And it is usually the individual whose experience and mature judgment are of value to society that is most often afflicted by this disabling disease.

HETEROPHILE PNEUMOCOCCIC SERUM IN THE THERAPY OF LOBAR PNEUMONIA*

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SINCE Forssman's⁹ work on heterophile antigen antibody reactions in 1911, the subject has been extensively studied. For many years, however, the interest of immunologists was largely academic, and the phenomenon seemed to have little bearing on the immune processes involved in protection against disease. Research was limited for the most part to the investigation of various animal tissues and bacterial species for the presence or absence of the heterophile antigen. The apparently bizarre distribution of this substance in nature is a fascinating study and still remains an enigma. For a general review of the subject of heterophile antigen antibody reactions, the reader is referred to the recent monograph by Davidsohn³ and the excellent discussions by Bull² and Topley and Wilson.¹⁶

Bailey and Shorb¹ were perhaps the first investigators to point to the possibility that heterophile antibodies may have some biological significance in relation to bacterial infections. They studied a large number of cultures of different types of pneumococci and found that rabbits injected with, or fed these organisms, developed a potent antisheep hemolysin in their sera. This hemolysin seemed identical with that stimulated in rabbits injected with boiled sheep corpuscles and was absorbed by homologous or heterologous boiled pneumococci, and with boiled sheep corpuscles. The hemolytic rabbit serum also showed a characteristic toxicity for the guinea pig. They further showed that rabbits immunized with sheep corpuscles were relatively resistant to intravenous injections of Type I pneumococcus and suggested the possibility that the variable amounts of antisheep hemolysin found in normal human serum¹ may be due to the fact that many individuals carry the pneumococcus in their mouths and upper respiratory tracts. All of the above findings seemed to be supported by the fact that these authors showed a definite increase over normal in the heterophile antibody content of human serum

in clinical cases of lobar pneumonia both during and after the infection. The data from which this conclusion is drawn are not detailed by these authors. Recently Finland, Ruegsegger, and Felton⁷ have studied a series of cases of lobar pneumonia for the antisheep hemolysin in the serum during and after the illness. They noted, among other things, that high heterophile antibody titers did not always determine recovery, also that persons treated with certain preparations of pneumococcic antigens did not develop heterophile antibody titers above normal. As a result of their studies, they concluded that heterophile antibody was likely not a factor in the immunology of lobar pneumonia, and that the pneumococcus, although admittedly a strong heterophile antigen in rabbits, probably did not act as such in humans. It was also suggested that only avirulent pneumococci contain heterophile antigen.

From the point of view that heterophile antibody may be one of the factors in recovery from human pneumonia, however, this paper of Finland et al⁷: (a) does not show that heterophile antibody is never a factor, inasmuch as it would not be the expectation that it is the only factor; (b) does not show that intact pneumococcal vaccine (instead of certain antigen preparations) is not a strong heterophile antigen in humans, and (c) does appear to show that of the fatal cases two-thirds have low and one-third have high heterophile antibody titers (i.e., 0.40 units and 80-1280 units), while of the recovered nonserum-treated cases one-third have low and two-thirds have high heterophile antibody titers. Their "favorable pneumonia cases" do and should correspond to normal immunes.

Also, it is well known that heterophile antigenicity and virulence of the pneumococcus are not related directly or inversely (Bailey and Shorb¹ and Eisler and Howard⁶).

Finland, Ruegsegger, and Felton⁸ object to the use of the serum clinically for the reason cited above and because of the fact that only animal

*From the Ancker Hospital, Saint Paul, Minnesota.

CHART I. SERUM CASES

Case No.	Age	Sex	Type	Leuko- cyte Count	Blood Culture	X-Ray Involve- ment	Reaction to Serum			Clinical Improve- ment	Amount of Serum Given	Dose Interval	Complications	Results	Comments
							Temp.	Chill	Serum Sickness						
1	37	M	N.T.	25,050		R.L.	.5°	None	Urticaria	Marked	60,000 U	4 Hrs.	Effusion	Recovery Crisis	Less toxic. Pulse, respirations and color improved. Effusion disappeared spontaneously.
2	26	M	N.T.	14,500	Neg.	R.L., R.M., L.U.	0°	None	None	Moderate	30,000 U	4 Hrs.	None	Recovery Lysis	Less toxic. Delirium stopped.
3	30	F	N.T.	7,750		R.L., R.M., R.U.	0°	None	None	None	60,000 U After 48 hr. interval, 40,000 U	6 Hrs. 6 Hrs.	None	Died	Patient failed to respond to anything. Alternately delirious and stuporous.
4	16	M	N.S.	15,150	Neg.	R.L.	.5°	None	Urticaria	Marked	60,000 U	4 Hrs.	None	Recovery Crisis	Less toxic. Pulse, color and respirations much improved.
5	14	F	N.T.	32,600		L.L.	.5°	+	Urticaria	Marked	60,000 U	4 Hrs.	None	Recovery Crisis	Less toxic. Pulse and respirations improved. Desensitized to serum.
6	21	F	N.S.	26,100		R.L.	1°	None	Urticaria	Marked	60,000 U	4 Hrs.	None	Recovery Lysis	Less toxic. Dyspnea, color and pulse improved. Less restless.
7	15	F	N.T.	22,800		R.U.	1°	None	Urticaria	Marked	60,000 U	4 Hrs.	None	Recovery Crisis	Less toxic. Respirations and pulse improved. Epistaxis three times.
8	34	M	N.T.	14,400		R.U.	1.5°	+	Urticaria	Marked	60,000 U	4 Hrs.	None	Recovery Lysis	Less toxic. Pulse and respirations much improved.
9	45	M	I	19,900	Neg.	R.L. with effusion	0°	None	None	Slight Temporary	60,000 U	4 Hrs.	Empyema	Died	Pulse and general appearance improved for twenty-four hours.
10	19	M	IV	19,050	Neg.	R.L., R.M.	.5°	None	Urticaria	Marked	60,000 U	4 Hrs.	None	Recovery Lysis	Less toxic. Respirations, pulse and color much improved.
11	36	F	I	29,100	Neg.	R.U.	0°	None	Urticaria	Moderate	60,000 U	4 Hrs.	Effusion	Recovery Lysis	Less toxic. Pulse and respirations improved. Effusion cleared spontaneously.
12	24	M	I	19,050	Neg.	R.L.	0°	None	Urticaria	Slight	60,000 U	4 Hrs.	Effusion	Recovery Lysis	Pulse slower and stronger. Became irrational. Effusion cleared spontaneously.
13	26	M	IV	20,650	Neg.	R.L.	.5°	None	None	Marked	60,000 U	4 Hrs.	None	Recovery Crisis	Less toxic. Dyspnea, pulse and color improved.
14	37	M	IV	11,300	Neg.	R.L. with effusion	2°	+++	None	Moderate	40,000 U	4 Hrs.	Empyema	Recovery Lysis	Less toxic. Delirium, pulse and respirations improved. Three rib resections necessary for localized empyema.

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16	22	F	N.T.	15,900	Neg.	R.U.	.5°	+	Urticaria	Marked	60,000 U	4 Hrs.	None	Recovery Crisis	proved. Patient is a chronic alcoholic, acutely so on admission. Mild delirium developed. Has tertiary lues.
17	58	F	N.T.	23,450		R.L. with effusion	0°	None	Urticaria	Moderate	60,000 U	4 Hrs.	None	Recovery Crisis	Less toxic. Pulse, color and respirations greatly improved.
18	30	M	I	18,650	Neg.	R.U.	1°	++	Urticaria	Moderate	40,000 U	6 Hrs.	Empyema	Recovery Lysis	Moderate improvement. Respirations improved.
19	25	M	N.T.	16,400	Neg.	R.L.	1.5°	+	None	Moderate	40,000 U	4 Hrs.	None	Recovery Crisis	Delirium lessened. Pulse and color improved.
20	40	M	N.T.	13,250	Neg.	R.U.	0°	None	Urticaria	Marked	60,000 U	4 Hrs.	Effusion	Recovery	Much less toxic. Pulse greatly improved. Less dyspnea. Although temperature rose with each injection, pulse stayed down after first dose.
21	34	F	N.S.	20,200	Neg.	R.M., L.L.	0°	None	None	None	10,000 U		Effusion	Died	Less toxic. Pulse and respirations improved. Effusion cleared spontaneously.
22	37	M	I	6,900	Pneumococci	R.U., R.M., R.L.	0°	None	None	Moderate	60,000 U	4 Hrs.	None	Died	Serum not repeated because of long time interval between onset and hospitalization.
23	26	M	II	17,700	Neg.	L.L.	1°	None	Urticaria	Marked	60,000 U	4 Hrs.	None	Recovery Crisis	Pulse and dyspnea improved for eight hours after first dose of serum. Patient irrational at time of admission.
24	37	F	I	16,150 24,250	Pneumococci	R.U., R.M., R.L., L.L. Effusion, right	.5°	None	None	Moderate	60,000 U	4 Hrs.	Empyema	Recovery Crisis	Pulse and respirations improved immediately. Less toxic.
25	27	F	N.T.	16,250	Neg.	R.L., R.U.	1°	+	Urticaria	Slight	60,000 U	4 Hrs.	None	Recovery Crisis	Taken out of oxygen tent. Dyspnea and color and pulse improved.
26	50	M	N.S.	4,750	Contaminated	R.L., R.U., L.L.	0°	None	None	None	80,000 U	4 Hrs.	None	Died	Required oxygen tent. Color improved however, and pulse slower and stronger.
27	17	M	IV	13,800	Neg.	R.U.	.5°	None	Urticaria	Marked	40,000 U	4 Hrs.	None	Recovery Lysis	Pulse improved. Patient admitted with delirium tremens. Old alcoholic.
															Less toxic. Dyspnea and color and pulse improved. Patient brighter. Serum sickness on the seventh day.

L.L. = Left Lower Lobe of Lung.
 I.U. = Left Upper Lobe of Lung.
 R.L. = Right Lower Lobe of Lung.
 R.M. = Right Middle Lobe of Lung.
 R.U. = Right Upper Lobe of Lung.
 N.S. = No Sputum.
 N.T. = No Typing Done.

CHART I. SERUM CASES—Continued

Case No.	Age	Sex	Type	Leuko-cyte Count	Blood Culture	X-Ray Involvement	Reaction to Serum			Clinical Improvement	Amount of Serum Given	Dose Interval	Complications	Results	Comments
							Temp.	Chill	Serum Sickness						
28	48	M	IV	17,400 21,850	Pneumo-cocci	R.U.	1.5°	None	None	Moderate	40,000 U	4 Hrs.	None	Recovery Lysis	Less toxic. Pulse and delirium improved. Has undulant fever.
29	69	F	IV	9,250 15,250	Neg.	R.L., L.U.	0°	None	None	Moderate	40,000 U	4 Hrs.	Consolidation	Died	Pulse and respiration improved. Original involvement cleared in three days. New involvement on fifth day. Hypertensive heart disease with failure.
30	45	M	IV	11,150	Neg.	L.L.	0°	+	Urticaria	Marked	60,000 U	4 Hrs.	None	Recovery	Less toxic. Cyanosis and dyspnea improved. Pulse slower and stronger.
31	27	F	I	14,700	Neg.	L.L.	0°	+	Urticaria	Marked	60,000 U	4 Hrs.	Effusion	Recovery Pseudocritisis	Less toxic. Pulse and color improved. Respirations less labored. Effusion developed on seventh day. Cleared spontaneously.
32	36	M	I		Pneumo-cocci	L.L., L.U.	1°	++	None	None	60,000 U	4 1/2 Hrs.		Died	Chronic alcoholic. Delirious on admission. Fibrillation present on admission.
33	58	F	N.T.	16,900 36,600	Neg.	L.L. with effusion	1°	None	None	Very slight	40,000 U	4 Hrs.	Empyema	Died	Pulse and temperature improved for twelve hours. Patient involuntary and delirious on admission. Fluid in left chest on admission.
34	41	F	IV	9,050		R.U., R.L., R.M.	0°	None	None	None	40,000 U	4 Hrs.	None	Died	Patient appeared brighter twelve hours later. Pulse improved. Cyanosis and dyspnea same.
35	22	F	IV	18,950 19,050		R.L.	0°	+	Urticaria Arthritis	Marked	40,000 U	4 Hrs.	None	Recovery Crisis	Marked improvement in respiration, pulse and color. Serum sickness on the eighth day.
36	46	F	IV	15,150 6,550	Neg.	Bilateral effusion	1.5°	+++	None	Moderate	40,000 U	4 Hrs.	None	Recovery	Less toxic. Dyspnea and color improved. Developed emesis following chill. Moderately severe cardiac decompensation and auricular fibrillation on admission.
37	24	M	IV	12,000 26,950	Neg.	L.L.	1°	++	None	Slight	90,000 U	4 Hrs.	None	Recovery Lysis	Delirium following first dose. Pulse and color much improved.
38	41	F	I	27,000	Pneumo-cocci	R.L., R.M., R.U.	1°	None	Urticaria	Moderate	80,000 U	4 Hrs.	Empyema	Recovery Lysis	Slightly less toxic. Color, pulse and respirations improved. Rib resection.

39	20	F	IV	15,600	Neg.	L.L., R.M.	0°	None	Urticaria	Marked	60,000 U	4 Hrs.	None	Recovery Crisis	Markedly less toxic. Pulse, color and respirations improved.
40	51	F	IV	23,250	Neg.	L.L.	1°	+++	Urticaria	Marked	60,000 U	4 Hrs.	None	Recovery Crisis	Less toxic. Pulse, dyspnea and color improved. Sensitive to skin test. Has latent lues.
41	53	M	IV	11,200	Neg.	L.U., L.L.	3°	None	None	Marked	40,000 U	6 Hrs.	None	Recovery Crisis	Less toxic. Decrease in dyspnea and pulse rate.
42	14	F	N.S.	12,750	Neg.	R.U.	6°	++	Urticaria	Marked	40,000 U	6 Hrs.	None	Recovery Crisis	Never any sputum after admission. Less toxic. Dyspnea and cyanosis gone after first dose.
43	26	F	IV	5,500	Neg.	L.L.	2°	++	Urticaria	Marked	30,000 U	4 Hrs.	None	Recovery Crisis	Moderately severe diabetic. Decrease in toxicity, dyspnea and cyanosis.
44	37	M	I	13,300	Neg.	R.U., R.M., R.L.	2°	++	Urticaria	Moderate	60,000 U	15 Hrs.	Emphyema	Recovery Crisis	Alcoholic with delirium tremens. Pulse and respirations improved. Delirium gone.
45	35	M	IV	28,950 14,000	Neg.	R.U.	1°	None	None	Marked	30,000 U	4 Hrs.	None	Recovery Crisis	Less toxic. Dyspnea and cyanosis absent. Pulse and respirations markedly improved.
46	49	F	N.S.	7,550	Neg.	R.L.	2°	+++	Urticaria	Marked	20,000 U	4 Hrs.	None	Recovery Crisis	Less toxic. Comfortable, and respirations quiet. Pulse normal.
47	27	M	IV	8,900	Neg.	R.L., R.U.	1°	None	Urticaria	Slight	60,000 U	5 Hrs.	None	Recovery Crisis	Slightly less toxic. Cyanosis absent. Dyspnea not affected. Spread to right upper lobe.
48	222	F	I	9,850 19,750		R.L., R.M., L.L.	1°	None	Urticaria	Marked	40,000 U	4 Hrs.	Effusion	Recovery Crisis	Less toxic. No dyspnea or cyanosis. Pulse and respirations normal. Emphyema did not develop.
49	60	F	N.T.	9,250		L.L.	1.5°	None	None	Marked	60,000 U	4 Hrs.	None	Recovery Crisis	Less toxic. Respirations and pulse markedly improved. Pneumonia complicated hypertensive heart disease with decompensation.
50	33	M	N.T.	21,200	Neg.	R.L., R.U., L.U.	0.5°	+	None	Marked	60,000 U	4 Hrs.	None	Recovery Crisis	Markedly less toxic. Pulse and respirations improved. Cyanosis and dyspnea gone.

L.L. = Left Lower Lobe of Lung.
L.U. = Left Upper Lobe of Lung.

R.L. = Right Lower Lobe of Lung.
R.M. = Right Middle Lobe of Lung.
R.U. = Right Upper Lobe of Lung.

N.S. = No Sputum.
N.T. = No Typing Done.

experiments using mice, rabbits, et cetera, seem to point to its value. It appears there is little choice in the early testing of antiserum other than to use animals, and moreover mice only are used in assaying the potency of ordinary horse antipneumococcic serum. Also, this objection seems hardly a valid reason against its use as an additional therapeutic agent in the serum therapy of pneumonia, since, as the authors themselves point out, only by clinical trial can its value be determined.

Powell, Jamieson, Bailey, and Hyde¹⁴ in 1933 studied the suitability of rabbits in determining the curative value of antipneumococcus serum and advocated the use of rabbits in place of the usual mouse protection tests in antipneumococcic serum. In these experiments, support was given to the value of heterophile antibody in the treatment of pneumococcic infections, the authors suggesting a combination of the usual protective antibodies developed in the horse, the heterophile antibody and the antibody which neutralizes skin toxic substances. This latter antibody was described by Jamieson and Powell¹² in 1930. Powell et al¹⁴ felt that a combination of these three elements would "more nearly simulate convalescent serum antibodies than would the usual horse antiserum," and that "any heterophile antigen in the horse serum would be neutralized and not need to be dealt with by the patient already reacting to heterophile antigen in the infecting pneumococci."

With these experimental data as a basis, an anti-pneumococcus serum was developed on a commercial scale.

Briefly, the method of preparation as outlined by the manufacturer is as follows: The new heterophile antipneumococcus serum contains three elements. First, the usual protective antibodies are developed in the horse and these antibodies are concentrated by the method first introduced by Izar and Caruso.^{10,11} Type I and II pneumococci are used and the finished serum has the same potency and the same number of units usually contained in serum of this type. The second element is an antitoxic substance produced in the horse by the injection of filtrates of broth cultures of Type I, II, and III, and Group IV pneumococci. This substance is therefore not type specific but according to Jamieson and Powell⁴ its action reduces toxic symptoms. The third element is the heterophile antibody. This is

developed in rabbits by the injection of a heterophile antigen. One objection to the usual horse antipneumococcic serum is the fact that the horse serum contains heterophile antigen and therefore its use adds an additional amount of heterophile antigen to the pneumonia patient who is already amply supplied with this material from the presence of the pneumococcus. For this reason, the native heterophile antigen is extracted from the horse antipneumococcic serum by the addition of a small amount of heterophile antibody rabbit serum. With the addition of the heterophile rabbit serum, the heterophile antigen is precipitated and filtered out of the horse immune serum. The horse serum is then reinforced by the addition of a certain number of heterophile antibody units of immune heterophile rabbit serum. This combination is then rational at least in Types I and II pneumococci infections, for it supplies the usual animal protective antibodies plus the heterophile and antitoxic elements. In Type III pneumonia, the ordinary antipneumococcic serum is, of course, of no value. In Group IV pneumonias, a whole series of separate type horse antiserum are being studied. Whatever efficacy therefore the new serum may have in pneumococcic pneumonia other than Types I and II, is based almost entirely on its non-type specific antitoxin and the heterophile antibody.

The series of 146 cases of lobar pneumonia reported below were treated at the Ancker Hospital between November 1, 1934, and June 1, 1935. These cases were treated on the Medical Services of Doctors Alfred Hoff, A. R. Hall, E. V. Goltz, and Harry Oerting, and their associates, and it is with their kind permission that this report is made. This series represents all of the cases of lobar pneumonia admitted to the hospital during this period. Of these, fifty were treated with the combined serum just described, while the other ninety-six cases received nothing but nonspecific therapy. The control series is far from perfect for it was impractical to attempt to treat every other case with serum. During the first two months of the period, serum was available on only one service and later some of the clinicians felt that the serum was not sufficiently advanced beyond the experimental stage to warrant its use. There was, however, no conscious selection of the serum cases on the basis of the severity of the disease. In some instances, age

CHART II
SERUM CASES NONSERUM CASES

Age	Recovered	Died	Recovered	Died
14-19	6		5	2
20-29	15		10	2
30-39	10	4	14	3
40-49	7	2	17	5
50-59	3	2	5	9
60-69	1	1	5	9
70-79			2	5
80-99				3

or duration of the illness before hospitalization may have appeared as a contraindication for the use of serum. Many of the serum-treated cases, however, were far from ideal in this respect as will be seen in Chart I.

Of the fifty cases treated with serum, nine died, making a mortality rate of 18 per cent. In the group of ninety-six cases treated nonspecifically, thirty-eight died, making a mortality rate of 39.5 per cent. This appears to be a significant difference; however, the number of treated cases is small, and the control series is not beyond some criticism. The death rate in the non-serum cases is high, which is not unusual in certain epidemics of lobar pneumonia among the class of patients treated in a charity institution such as the Ancker Hospital.

Chart II shows the cases treated by serum and the nonspecifically treated cases arranged in age groups. Fourteen years was selected as the lower age limit. All cases younger than this were treated on the pediatric service. It will be noted that in the first two age groups there were no deaths in the serum-treated cases, while in a somewhat smaller number of nonserum cases of the same age there were four deaths. Only two cases over sixty years of age were treated with serum, while there were twenty-four cases over sixty years not treated by serum. This latter group showed an extreme mortality of 70.8 per cent. This undoubtedly accounts, to some extent, for the difference in total mortality. Excluding all cases over sixty years of age in each group, however, there is still a considerable difference in mortality. The mortality rate in the serum-treated cases under sixty years of age was 16.7

CHART III. SERUM CASES

Type	Recovered	Died
I	8	3
II	1	0
III	0	0
IV	16	2

CHART IV. NONSERUM CASES

Type	Recovered	Died
I	7	3
II	1	1
III	1	0
IV	8	4

per cent, while in the control group it was 29.2 per cent. The authors are of the opinion that age alone is no contraindication to serum therapy and, perhaps, the mortality in this older group might be reduced by the use of serum.

Because of the fact that in the cases over sixty years of age serum was used in only two instances, the two groups are comparable only if those cases over sixty years of age are omitted. Therefore, in the following statistical study of the mortality rate in the serum-treated and control groups, only those cases under sixty years of age were used. According to the Chi square test for the four-fold table shown in Chart X, this difference in mortality would occur by chance only twelve times in one hundred. The Chi square for this four-fold table was computed as follows: $\text{Chi}^2 = (ad - bc)^2$ which gave a Chi square of 1.56 for which the probability integral was .12.

In Charts III and IV, the cases are analyzed as to death rate in the four types of pneumococcic infection. Unfortunately, the data here are incomplete. Only thirty of the cases treated with serum were typed. In five additional cases in this group, no sputum was available for typing (Chart I). Two of these five died shortly after admission. In the other three, no sputum was raised after serum therapy was instituted. In the nonspecifically treated group, twenty-five cases were typed. Most of the pneumonias in each group were Types I and IV. The number of cases is too small for the deduction of definite

CHART V. BLOOD CULTURES IN SERUM CASES

Type	Recovered	Died
I	1	3
II	0	0
III	0	0
IV	1	0
No growth	30	5

CHART VI. BLOOD CULTURES IN NONSERUM CASES

Type	Recovered	Died
I	0	0
II	0	1
III	0	0
IV	0	0
No growth	13	6

CHART VII. TIME RELATIONSHIP BETWEEN ONSET AND SERUM THERAPY

Hours	Recovered	Died
12-24	4	0
24-48	12	1
48-72	11	2
72-96	6	2
96-120	4	1
120-144	3	0
144-148+	1	2
Time unknown	0	1

conclusions, but it is interesting to note that in the Type IV pneumonias, the mortality rate is considerably lower in the serum-treated cases. It will be remembered that in this type of infection, only the heterophile antibody and the antitoxin in such antiserum are active.

The blood culture findings are shown in Charts V and VI. Only single cultures were taken on each case and only a small percentage of the nonserum cases had blood cultures done. Three or four cases of Type I pneumonia with positive blood cultures died.

Chart VII shows the time relationship between the onset of the pneumonia and the first dose of

CHART VIII. TIME OF ONSET TO HOSPITALIZATION
SERUM CASES

Days	Recovered	Died
1	13	0
2	11	3
3	10	3
4	4	0
5	1	1
6	2	1
Not known	0	1

serum. It is interesting to note that in the seventeen cases given serum within forty-eight hours of the onset of symptoms, there were only three deaths, or a mortality of 5.8 per cent.

Analysis of the complications in each group shows no appreciable difference. In the serum-treated cases, the only serious complication was empyema. This occurred in seven cases or 14 per cent. In the nonserum cases, empyema occurred as a complication in only eleven cases or 11.4 per cent. Five other cases in this group had such complications as pericarditis, lung abscess, or otitis media and mastoiditis, bringing the total complications to 16.6 per cent.

The morbid period in days shows no appreciable difference when the fatal cases are excluded. The average hospital days for the serum-treated cases was 21.9 and for the control group 21.6.

In Charts VIII and IX, the cases are analyzed as to the relationship of the time of onset to the time of hospitalization. It will be seen that in the serum-treated cases, hospitalized within 48 hours of the onset, the mortality was 10 per cent while in the similar nonserum group, the mortality was 34.3 per cent.

In Chart I, the reactions to the serum are noted in each case. The average rise in temperature in degrees following the injection of the serum is recorded. In only one instance, Case 42, was this alarming. The average temperature rise in this case was 6° F. and on one occasion the temperature was 108° F. and on another occasion 107.6° F. At no time, however, did the patient show any signs of collapse and the temperature was out of proportion to the degree of toxicity exhibited by the patient. For the most part, the temperature reactions to the serum

CHART IX. TIME OF ONSET TO HOSPITALIZATION
NONSERUM CASES

Days	Recovered	Died
1	11	4
2	10	7
3	14	9
4	5	8
5	3	5
6	4	1
7	4	2
8	1	0
9	0	0
10	1	2
Not known	2	0
In hospital	2	1

were of little consequence. Nineteen of the fifty patients had chills of varying degrees shown on Chart I. None of these was alarming save in the case with the high fever mentioned above. Serum reactions in the form of urticaria or arthritic symptoms were observed in twenty-eight of the fifty cases. Many of these reactions were annoying, but none was persistent and they were controlled with small repeated doses of adrenalin and a local application of calamine lotion. The matter of serum sickness following the use of this serum is interesting. According to Davidsohn^{4,5} as previously suggested by Taniguchi,¹⁵ serum sickness is associated with the injection of a heterophile antigen usually in the form of horse serum, and he has shown that patients suffering from serum sickness have a definite increase in the heterophile hemolysin in their sera. It is interesting to note that no deaths occurred in the twenty-eight cases showing evidences of serum sickness. Of the twenty-two showing no evidence of serum sickness, thirteen recovered, and nine died. Of these nine fatal cases, only two lived sufficiently long to reach the period in which these manifestations are usually observed. Seven of them died after illnesses of one to five days. One lived twenty-three days and another thirty-four days. The significance of this finding is not clear, but the recent work of Powell, Jamieson, and Kempf¹⁸

CHART X. FOURFOLD TABLE FOR THE FORTY-EIGHT
CASES UNDER SIXTY YEARS OF AGE TREATED
WITH HETEROPHILE SERUM
AND THE
SEVENTY-TWO CONTROL CASES UNDER SIXTY
YEARS OF AGE

	Number Recovered	Number Died	Total
Number treated	40 (a)	8 (b)	48
Number not treated	51 (c)	21 (d)	72
Total	91	29	120

indicates that heterophile antigen is not responsible for serum sickness.

In one case, Case 29 (Chart I) where the serum was used, a definite spread of the consolidation occurred and the patient died. The spread of the lesion following serum therapy may be interpreted to mean that in spite of the individual's natural resistance plus the passive immune bodies introduced, the virulence of the organism was sufficient to overwhelm the patient. One other instance not included in this series has been seen where progression of the lesion occurred after serum therapy. This patient recovered. It is possible that the dosage in the first instance was inadequate.

In Case 21 (Chart I) only 10,000 units of serum were given. The therapy was discontinued because it was thought useless in a case where the history indicated an onset ten days before admission to the hospital.

The degree of clinical improvement in each serum treated case is noted in Chart I. The principal points taken into consideration were: decrease in dyspnea, cyanosis, pulse rate, and delirium. In some instances, dramatic drops in temperature were noted, but in many of the cases the temperatures seemed to be affected only slightly in spite of evident decrease in toxicity. Of the fifty serum-treated cases, twenty-five were judged to have been markedly improved clinically; fourteen seemed to have shown moderate improvement; six were slightly improved, and five showed no effect of the therapy. In certain cases, the decrease in dyspnea and cyanosis was beyond any doubt.

Discussion

This is a preliminary report of a study which is being continued at the Ancker Hospital this

year. The evaluation of any given therapeutic measure is difficult, but it is felt that the analysis of this series of cases should be of some value in the eventual determination of the usefulness of heterophile antipneumococcic serum. Serum therapy in the treatment of lobar pneumonia is not comparable to that in diseases such as diphtheria where antitoxin is almost perfectly specific. The best that can be hoped for is a decrease in mortality. In this series, it was felt that at least half of the patients were definitely improved clinically following the therapy, but, as pointed out above, there has been no statistically proved decrease in mortality. The probability integral of .12 is encouraging, and if this or better probability figures can be shown in other similar series, the result would be considered encouraging. It is planned in the series now being studied to include determinations on the serum heterophile antibody in lobar pneumonia in treated and untreated cases.

Summary

A series of one hundred forty-six cases of lobar pneumonia have been analyzed. Fifty of these cases were treated with heterophile antipneumococcic serum. There was no statistically proved decrease in mortality, but statistical mor-

tality figures obtained and the clinical improvement observed in certain of the patients were sufficiently encouraging to warrant further study.

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ACUTE ATROPHY OF BONE: REPORT OF AN UNUSUAL CASE INVOLVING THE RADIUS AND ULNA*

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ACUTE atrophy of bone is a definite clinical entity distinct from the chronic atrophy of bone that follows disuse. Although Sudeck, in 1900, is generally credited with first establishing the condition as a clinical entity, it had been mentioned previously in the literature. Wolf touched upon the subject in 1877 and in 1883, and Kümmell first reported, in 1895, his classical cases of atrophy and collapse of the spinal vertebrae.

Clinical Manifestations

The condition is commonly seen in the extremities and spinal column. The lower extrem-

ity is affected more often than the upper and atrophy is usually limited to the bone of the foot, although the lower end of the tibia and fibula may also be involved. There is frequently an initial injury, although atrophy may develop spontaneously. Such injury is usually slight, a simple twist, a blow, or a bump, and there ensues a latent period which varies in length and may last a few days to a few weeks, although when the spinal column or long bones are involved it may extend into months. The signs vary according to the site of the disease. In the upper extremity the condition is manifested usually in the bones of the hands and wrists, and is more often seen following a severe injury, such as a frac-

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ture, than is the case in the lower extremity. Edema, cyanosis, and atrophy of the skin are the common objective signs, and pain and soreness the subjective. Wasting of muscle is commonly seen. In the lower extremity the disease usually lasts over a period of months, but it may last several years and cause total disability in the extremity affected.

Etiology

Noble and Hauser, in 1925, made a survey at The Mayo Clinic and reported forty-eight cases. They presented four theories for consideration. Gurd, of Montreal, has more recently furnished us with an excellent résumé of the subject.

Noble and Hauser propounded as their first theory one of reflex trophoneurosis, wherein the condition was attributed to constant irritation of the sensory transmitting impulses along afferent channels to the spinal ganglia, producing trophic changes in the skin and disintegration of bone. Sudeck, in his original paper, was of the opinion that the condition resulted from a low grade inflammation, but two years later, in 1902, he agreed with Kienböck that atrophy of bone was essentially trophoneurosis. I can recall several cases in which treatment was carried out at the clinic for acute atrophy of the bones of the foot and in which abscesses subsequently developed; following drainage of these abscesses recovery gradually took place. No definite connection was demonstrated in these cases between the abscesses and the bone. Briefly, the theory of trophoneurosis rests on the premise that on the production of a disturbance in the metabolism of bone, the bony substance is broken down more rapidly than it can be reconstructed.

Noble and Hauser's second theory, which was that of Hilgenreiner,^{4,5} favored the idea of inactivity. Hilgenreiner's conclusions were derived chiefly from the study of gunshot wounds. He believed that the chief etiologic factor was disuse, that the intensity of the atrophy was influenced by the individual disposition of the patient, and that atrophy occurred distal to the injury and resulted from ischemia. The advocates of the theory of disuse argue that the primary etiologic factor is disuse but admit that nerve injury, which produces vascular changes and also infection, may play a part. These latter factors they cover by the term "ischemia." Hilgenreiner believed that pain was an important causative

factor of the atrophy, whereas Sudeck, proponent of the theory of trophoneurosis, believed that pain was secondary to atrophy.

Noble and Hauser's third theory was that of infection, but it has very few advocates. To my knowledge there have been no cases reported wherein an actual inflammatory lesion has been demonstrated in the bone marrow, either microscopically or bacteriologically.

The fourth theory is that advanced by Cohn. He observed that there was a definite relationship between atrophy and regeneration of bone. He observed that when two bones lie side by side, one fractured and the other not, only the fractured bone showed atrophy, and that in some cases when the joint was involved atrophy proceeded in both directions. He attempted to explain these facts as being the result of a third type of bone formation, quite distinct from the endosteal and periosteal types. He argued that calcium was carried by the lymph vessels and deposited in soft tissue where there is a deficiency of carbon dioxide in the blood. According to him the roentgenograms disclosed shadows of calcium in the soft tissues in cases in which the type of regeneration of bone he described was playing an extensive part. His argument was that the atrophy seen in the roentgenogram was the result of a demand for calcium elsewhere. He argued that while in one case endosteal and periosteal regeneration might be sufficient, in another they might be insufficient, and this third type of formation of bone was then called into play. This theory, while presenting some attractive ideas, does not satisfactorily explain acute bone atrophy.

As a result of their study of cases at the clinic Noble and Hauser came to the conclusion that the only theory which appeared to explain satisfactorily all the pathologic processes in acute atrophy of bone was that of trophoneurosis. They concluded, and I agree with them, that the symptoms and signs of acute atrophy of bone are explicable by reflex irritation and by stimulation of the trophic nerves, producing an increase in metabolism in the tissues.

Radiologic Findings

Atrophy is often missed in reading a roentgenogram because there is no alteration in the form but only a diminution in the density of bone. Allison and Brooks demonstrated that dis-

use does not affect the chemical composition of bone, but that the proportions of water and inorganic and organic salts are markedly changed in a comparatively short time. There is less bone matrix rather than a change in the character of the bone, a quantitative rather than a qualitative change. This is immediately noticeable when comparison is made with a roentgenogram of a sound limb. The lesion is almost always distal to the site of injury, and the more distal the bones are the greater the atrophy. The roentgenogram discloses a moth-eaten appearance of the bones involved during the acute stage, this appearance being the result of what might be called perforations in the spongiosa. The lamellæ are not clear cut but fade into one another. It usually takes from four to six weeks before these changes are manifested in the roentgenogram. As the condition becomes more chronic, the moth-eaten appearance disappears. The spongiosa becomes wide-meshed and the lamellæ are thicker and stronger, but chiefly the longitudinal fibers. If atrophy continues over a long period the remnants of the spongiosa may be lost entirely.

Prognosis and Treatment

Acute atrophy of bone runs its course in from a few months to several years. Treatment consists of heat, contrast baths, massage, and active and passive movements, the former being by far the most important. Use to the point of toleration of the affected limb is indicated. Supports and braces and casts are contraindicated, as are manipulations, particularly under anesthesia. Leriche of recent years has advocated ganglionectomy and has reported cases showing its usefulness, but it seems rather a heroic measure for a condition that responds so well to conservative measures.

The forty-eight cases reported from the clinic by Noble and Hauser covered the period from 1912 to 1924. I have recently gone over our files at the clinic from 1930 to 1934, inclusive, and have found fifty-five additional cases. In eight of these acute atrophy occurred in the hand, in forty-seven in the foot and ankle. In eighteen of these forty-seven cases atrophy was definitely connected with trauma; in the remainder it could not be definitely classified as to etiology, although infection, disuse, and arthritis might have been a factor in some. A nota-

tion of interest was that those cases in which the onset was sudden and without apparent cause, and wherein swelling and pain came on rapidly and were persistent, were more resistant to treatment than were those in which atrophy followed trauma.

In marked contrast to this group was a case of acute atrophy of the bones of the forearm which I wish to report. In the roentgenogram in this case there was practically complete disappearance of bony substance in both the radius and ulna. The case in our experience is so unusual that I think it worthy of a somewhat full description; the fact that acute atrophy in the diaphyses of long bones is noted so rarely makes it one of unusual interest.

Report of Case

The patient, a man thirty years of age, came to the clinic in October, 1925. He had always been well until November, 1923, when he had fallen and injured his left arm. He had not paid much attention to this at the time, but had gradually begun to have discomfort in this arm. It was not until four months later (February, 1934), however, that it had become serious enough to interfere with his work. A diagnosis of rheumatism had been made and the pain had been relieved somewhat by heat. The arm had then become very much swollen and painful and the patient had consulted a physician. The arm had been placed in a splint for three weeks, and after it had been removed, heat and massage had been used for three months, but with little effect. The splint had then been reapplied. No definite diagnosis had been arrived at.

In August, 1924, that is, nine months after the onset, the patient had had general malaise, aches, and pains, with chills and fever. His ankles had become swollen and tender. He had gradually recovered from this, but in November, 1924, one year from the time of onset, he had had a second attack. He had been sent by his physician to take some mud baths, and at the sanatorium, while peeling an orange, he had had terrific pain in his forearm and had heard something snap. Roentgenograms, the first that were taken, had revealed the ulna to be a mere shell of bone and that it had fractured in its upper third. Soon after this the arm had been operated on and some bone removed, but a definite diagnosis had not been made. A great deal of drainage of a serous nature had followed and the feeling of malaise and generalized pain and swelling in the feet and ankles had cleared up. Roentgenograms taken two months later had shown even more atrophy of the ulna. Amputation had been advised. The patient had then consulted an orthopedic surgeon who advised against amputation, but he had removed a piece of bone from the ulna and sent it to a laboratory for diagnosis; the report returned was negative. The arm had then been placed in a cast and drainage had persisted until August, 1925. In October, 1925, while using the arm



Fig. 1. Atrophy of radial and ulnar diaphyses with pathologic fracture of upper third of radius and ulna.



Fig. 2. One year after bone graft to radius and eight months after bone graft to ulna.



Fig. 3. Twelve years after onset: loss of upper third of ulna with complete regeneration of radius.

for some trivial purpose, a pathologic fracture had occurred in the middle third of the radius, and the orthopedic surgeon who had previously been consulted had then changed his opinion and advised amputation. The patient's blood had been examined repeatedly for syphilis, with negative results; nor was there any history of it.

Physical examination at the clinic gave negative results except for the nonunion and extreme atrophy of the ulna and the fracture and atrophy of the radius. (Fig. 1.) In fact the patient was in robust general health, and the laboratory tests, including calcium, phosphorus, and blood tests, were all normal. The condition could not be accounted for and the advisability of amputation was seriously considered; finally, however, the patient was advised to wait and he agreed to stay under observation. In spite of medication, heliotherapy, and other measures, atrophy increased in degree and the bones became even more porotic. Several times, 3 or 4 ounces (85 to 113.4 gm.) of blood-tinged, serous fluid was aspirated from the forearm, but bacteriologic studies gave negative results and the guinea pig tests for tuberculosis were also negative. Finally, in August, 1926, almost three years after the onset and eight months after admission, when there seemed to be a little increased calcification, a large massive bone graft taken from the right tibia was placed on the radius. The radius was selected for operation because it was in better condition. The bone was so soft that the graft had to be tied to the radius with catgut sutures thrown around the fragments. The bone was so fragile and porotic that it would have been useless to attempt to use beef-bone screws or autogenous bone pegs to fix the graft to the fragments.

By January, 1927, roentgenograms revealed that the radius and the bone graft had united and both had

increased in density and in size. The ulna had not changed and was almost entirely absorbed. If any of the ulna was to be saved, action was necessary, so on January 18, 1927, a massive graft was placed on the ulna in the same manner as that which had been placed on the radius. Much hemorrhage was encountered, particularly at the upper end, where destruction had been greatest. In August, 1927, roentgenograms revealed that both bone grafts were in good condition and were increasing in size and strength, but that the upper end of the ulna was fading out of the picture more and more and the elbow was quite unstable. (Fig. 2.) My regret is that some effort to reconstruct the upper end of the ulna by aid of another bone graft was not made at this time.

I have heard from this patient at intervals, at least once a year, and roentgenograms sent us in February, 1935 (Fig. 3), give evidence of marked regeneration of the bone where the bone grafts were placed; the elbow, however, is flail, the upper end of the ulna being entirely absent. The radius is fully restored. The patient reports that, aside from the "wobbly" elbow, he has an excellent hand and forearm.

The condition encountered in this case is, in our experience, unique; an acute atrophy finally going on in a period of two years to almost total disappearance in the roentgenogram of the ulna and the radius. Bone grafting saved the radius and the lower two-thirds of the ulna. We have no adequate explanation to offer as to the etiology. The trauma was comparatively trivial and there ensued a latent period. At the time the operations were performed at the clinic pieces of tissue

and bone were sent to the Section on Pathology. No evidence of any malignancy or new growth was reported, the tissue revealing only inflammatory changes. The swelling, pain, serous drainage, malaise, and swelling of the ankles and feet all point to toxicity. Was it inflammatory or metabolic (trophoneurotic) in origin? I am not at all certain, though I favor the metabolic theory.

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URETHRAL DIVERTICULUM*

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URETHRAL diverticulum or urethrocele is a rather infrequent finding. This is true not only because of the actual rarity of the condition, but also because it may be symptomless until infection occurs. Watts surveyed the literature of 1906, collected thirty-nine cases, adding one of his own, and suggested a classification. Carlton, in 1932, found 100 cases reported in the literature, and numerous isolated reports of such cases have appeared in the literature since then. The apparent increased incidence is no doubt due to the recent widespread use of cystourethroscopy as a diagnostic procedure.

Urethral diverticulum may be defined as a pouch or outpocketing, the lumen of which is continuous with that of the urethra. False diverticula composed of scar tissue may develop following periurethral abscesses and should be differentiated from true diverticula which are lined with squamous epithelium and whose walls frequently contain smooth muscle fibers. This differentiation is not always accurate, however, because a false diverticulum, if well drained, may acquire an epithelial lining, whereas a true diverticulum may lose its lining as a result of inflammatory changes. The usual classification given is that of Watts, but LeComte and Herschman recently modified it from a clinical stand-

point and based it on the location of the orifice of the diverticulum.

These urethral diverticula may be either congenital or acquired. Theoretically, according to LeComte and Herschman, a congenital diverticulum may be due to (1) defective union of the urethral plates derived from the entodermal genital tubercle, as these close to form the urethra on the under side of the penis, (2) defective union of that part of the urethra derived from the pars phallica of the genital tubercle with that derived from the urogenital sinus posteriorly, or from its union with the glans penis anteriorly, or (3) misformed or overlarge glands. Cysts of congenital origin may later rupture into the urethral lumen, thus presenting a combined type of etiology. Acquired types of diverticula are usually due either to trauma or to infection.

During the years 1924 to 1934, inclusive, nineteen patients with urethral diverticulum were operated on at The Mayo Clinic. Fourteen of the patients were women, their average age being 41.3 years; the average age of the five men was 47.4 years. All of the diverticula of male patients were situated in the posterior portion of the urethra with the meatus opening into the prostatic portion or into the urethral lumen between the external and internal sphincters. In the cases in which the patients were women, six of the diverticula opened into the posterior por-

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on of the urethra, three between the sphincters, and one opened into the anterior part of the urethra; in four cases the position was not stated. Furniss has pointed out that numerous glands analogous to those found in the prostate gland occur in the floor of the female urethra, any one of which may be a potential diverticulum.

The etiology of the lesion was difficult to determine, attention being called to the condition only by infection. The symptoms of which the patient complained were usually frequency, dysuria, a dribbling of urine, and hematuria. Some patients had perineal pain of a dull character. Two women complained of a vaginal mass, pressure on which caused a urethral discharge. Stones formed in the sac in two cases, whereas in one an epithelioma of grade 3 was found at operation. Excision of the sac and reconstruction of the urethra was carried out in fourteen cases: In one case partial excision was done; in one case the lining of the diverticulum was cauterized; in two cases the infected sac was drained and packed, and in one case examination only was carried out. The results, as judged by freedom from symptoms and control of urinary flow, were excellent in one case, good in six, fair in four, and were not noted in two cases. The ultimate result was poor in one case because of a later exacerbation of a coexisting ulcerative cystitis; one patient died four days after operation from a cardiac condition.

One of us (Walters) within the past six years has operated on four patients with urethral diverticula. These cases differed in no essential respect from those in the rest of this series, except Case 4, in which the diverticulum was especially large.

Report of Cases

Case 1.—A married woman, aged thirty-five years, came to the clinic complaining of general debility and recurrent attacks of what had been diagnosed as cystitis and pyelitis. Physical examination gave essentially negative results. Laboratory examination revealed urine which contained albumin grade 4, and pus, grade 4. There was no anemia, but there was a leukocytosis, cells numbering 17,000 per cubic millimeter. The flocculation test for syphilis was negative. Roentgenograms of the thorax and abdomen were reported negative. Cystoscopy revealed chronic cicatricial urethritis, the urethra being filled with a purulent secretion. There was a small urethrocele which was infected. Local treatment to the urethra gave the patient only mod-

erate relief, and operation for the urethrocele was advised. The patient preferred medical treatment and a regimen was outlined for her.

The patient returned one year later with her old symptoms made worse by pain and spasms during micturition. Physical examination again gave negative results. Analysis of the urine showed an occasional erythrocyte and pus cells, grade 2. On cystoscopic examination a small opening in the left side of midurethra was visualized. Into this opening about 3 cm. of catheter could be passed. A urethrogram visualized the pocket demonstrated on cystoscopy. Because of the continued symptoms, operation was performed. Through a mid-line incision in the anterior vaginal wall, the under surface of the urethra and bladder was exposed. A diverticulum was found with its opening between the internal and external sphincters. The opening into the urethra was then closed with interrupted sutures of chromic catgut. The postoperative convalescence was uneventful, and the patient was dismissed from the hospital on the eleventh postoperative day.

Case 2.—An unmarried woman, aged thirty-eight years, came to the clinic complaining of intermittent enuresis of six months' duration. The doctor at her home had cauterized an urethral polyp, following which a periurethral abscess had developed. Two recurrences of the abscess had taken place during the six months prior to admission. The patient's chief trouble at the time of admission was a feeling of discomfort and pressure in the region of the urethra.

On physical examination a mass about 2 by 2 cm. was palpated under the urethra, above the anterior vaginal wall. Laboratory examination revealed nothing abnormal. On cystoscopic examination a diverticulum was visualized with its opening to the left of the mid-line and approximately 1 cm. distal to the sphincter. At operation, which was performed through a vaginal incision, the diverticulum was inverted and was obliterated by interrupted sutures. The patient's postoperative convalescence was uneventful and she was dismissed on the eleventh postoperative day.

The patient remained perfectly well for six months when, following a severe attack of influenza, she again began to have some dysuria and a slight urethral discharge. On reëxamination at the clinic some purulent material was expressed from the urethra by pressure high on the left side through the vagina. At operation, through a vaginal incision, a small abscess cavity was drained and a minute opening into the urethra was closed. There was no other evidence of retention pockets or of a diverticulum. The patient's postoperative convalescence was uneventful and she was dismissed from the hospital on the ninth postoperative day. She returned to the clinic one year later with an entirely new complaint, and stated that she had only occasional twinges of pain at the site of her previous trouble. This case represents examples of both true and false diverticula.

Case 3.—A married woman, aged thirty-five years, came to the clinic complaining of dysuria since an operation for ectopic pregnancy seven years previously.



Fig. 1. A urethral catheter is coiled in the urethral diverticulum, which is visualized over the symphysis pubis.



Fig. 2. The excised diverticulum, showing its size.

Cystoscopic examination done elsewhere had revealed nothing abnormal, but the ureteral orifices had been cauterized because they looked small. This procedure had relieved the patient of some of her distress for a few months, but her symptoms soon returned.

Physical examination at the clinic gave negative results, as did all of the laboratory investigations, except for the finding of pus, grade 2, in the urine. Cystoscopic examination revealed a pocket, 1 cm. in diameter, just distal to the sphincter; pressure through the vagina on this pocket expressed mucopurulent material from the urethra. Dilation of this pocket with water reproduced pain similar to that which the patient had had. At operation, the diverticulum was destroyed with the cautery and the urethra was closed with interrupted sutures. The postoperative convalescence was without

incident and the patient was dismissed from the hospital on the fifth postoperative day. The patient reported by letter two years later that she was completely free of symptoms and that urinary control was unimpaired.

Case 4.—This patient, an unmarried woman aged thirty-six years, came to the clinic complaining of trouble with her bladder which had been present for two years. Her symptoms had begun with leukorrhea, accompanied by frequency and dysuria. During the two months prior to her admission she had been troubled with increased frequency, nocturia, and the passage of pus and blood in the urine. Lavage of the bladder elsewhere had given no relief.

Physical examination gave essentially negative results. Laboratory investigations were negative except for the urinary findings. The urine contained gross pus and blood and albumin, grade 2. Cystoscopy revealed a diffuse cystitis and elevation of the trigone, due either to the infection or some extravescical deformity. Stains of the vesical sediment disclosed many gram-negative rods, but no bacilli of tuberculosis. Intravenous urograms showed the kidneys to be normal both in outline and function. After a few days of lavaging the bladder reëxamination revealed a diverticulum 4 by 3 cm. posterior to the urethra (Fig. 1). At operation, the anterior vaginal wall was dissected away and the diverticulum was removed (Fig. 2).

Postoperative convalescence was uneventful, and the patient was dismissed from the hospital on the eleventh postoperative day. There was a moderate degree of incontinence when the bladder became full, but the patient reported that this was improving.

Summary

Nineteen cases of urethral diverticulum, in which operation was performed in the years 1924 to 1934, inclusive, at The Mayo Clinic, are reported.

The results, as judged by freedom from symptoms and control of urinary flow were excellent in four cases, good in seven, fair in four, and were not noted in two. One patient died from a cardiac condition postoperatively and one patient, three years later, underwent an operation for an ulcerated condition of the bladder. Success in the management of this lesion depends on maintenance of urinary control and on adequate treatment of any urinary infection.

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DIETARY AIDS IN CONTROL OF CONSTIPATION AND DIARRHEA*

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IN CASUALLY turning the pages of a current magazine, there loom forth numbers of advertisements urging, "Eat this!" "Drink that!" "Send for free diet list!" This may explain somewhat why patients have become "diet-minded" and have come to believe that a set diet list is necessary for a cure of their stomach and bowel troubles. Only recently a patient scathingly commented to me, "Well you wouldn't last ten minutes in, unless you had on hand several diet lists." The physician is often assailed with a request for a diet before he has even made an investigation or decided on his plan of treatment. It is well to return to the realization that the problem of constipation or diarrhea is not an abstract affair but of vital, individual concern, and that individual advice is necessary. Principles may be true but it is important to fit them to the patient, and not vice versa. During these recent years, diet has assumed a very prominent place in treatment and justly so, for as good a fuel mixture as can be tolerated is essential to the proper function of the body. It is my purpose to suggest some of the dietary principles in relation to constipation and diarrhea, so that the developments in the field of dietetics and nutrition may be applied to the individual.

Probably 75 per cent of the people in this country are more or less constipated, which is one reason for the miles of advertising in periodicals and billboards. Formerly, constipation might be dignified by attributing it to a sluggish liver, while more recently Axel Munthe, in "The Story of San Michele," showed the reward to be derived by invoking as a cause mucous colitis, spastic colitis, and so forth. In constipation, as commonly understood, I believe that diet has been unduly emphasized and even more objectionable in many instances has been the encouragement to over-distend the bowel with artificial bulk. Not enough stress has been placed on the importance of changes in occupation, nervous strain, and the whole complex whirl of living. So often is the tired mother, the nervous clerk or

teacher, prescribed a diet that contains as much indigestible material as possible. It is recognized that the tendency to eat concentrated foods exists, but, if a patient has that habit, sudden overloading with quantities of roughage usually makes his condition worse.

It would seem wise to emphasize the general question of constipation and to minimize, rather than to stress, any possible unpleasant features of being constipated. One need not be careless or flippant but certainly all agree that there has been far more fuss and furor about missing a bowel movement for a day or two than is warranted. As with other parts of the body, a "short circuit" from colon to brain may give more symptoms than the colon alone. It is wise to withhold suggestions concerning diet until the end of the consultation. The physician should be sure that adequate intake of fluids is maintained, about 2 quarts (2 liters) daily; more if there is excessive sweating. It is well to include two glasses of milk, meat at least once daily and twice if the person is active, one or two eggs, and to fill out the remainder of the diet list with any and all of the fruits and vegetables, cooked or raw. Some people are better if fruits and vegetables are cooked.

The old maxim, "one man's food is another man's poison," is always applicable and this, by the way, can be taken as a criticism of any printed diet that is passed out indiscriminately. One should be alert to the intolerance of certain patients to certain foods, whether such intolerance is attributable to possible cholecystitis or to allergy. It is necessary to know the tolerance of the individual patient as learned from intelligent observation. Supplementing of natural foods with artificial bulk may be done with agar but I think the need of bulk should not be emphasized habitually. Speaking in general, bran and preparations of whole wheat are best omitted from any diet. I do not forbid them if the patient has been getting results, but I do not advise them.

The general incidence of diarrhea is less than that of constipation but the very nature of the

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trouble is such that the patient is insistent that measures be taken which will permit him to live without having to remain in the proximity of the bathroom. As this article deals only with dietary suggestions, without regard to specific diseases, it is easier to consider the diet as it applies to acute and to chronic types.

There is the oft-repeated observation, especially with reference to cases of chronic diarrhea, that, no matter what the etiology, the general status and nutrition is further impoverished by dietary restrictions. The patient, in his eagerness to be relieved of his trouble, observes all the "don'ts" of his advisers, both medical and lay, with the expected result of a most amazingly inadequate dietary. The more common acute forms of diarrhea, such as those attributable to infection by staphylococci, bacilli of dysentery, or salmonella, are usually self-limited to a few days. In such instances, it is unnecessary to urge the taking of food for the first twenty-four hours; in fact, resting the bowel is more helpful than giving food. After twenty-four hours, the best foods are beef, mutton, rice, broths, eggs, toast, tea, and coffee. To these basic foods of low residue may then be added custards, potatoes, simple puddings and stewed fruits. Early in the illness, an adequate supply of fluid is much more important than food and often it may be necessary to administer salt solution by vein or under the skin.

Milk is often advised for patients who have acute diarrhea, but even if milk is boiled it leaves a large residue in the bowel. In general, it seems better to withhold milk until the active phase has subsided.

Experimentally, it has been shown that chunks of meat are digested better than is minced or scraped meat. This may not be entirely true for the intestine of man, yet a piece of steak or roast beef is more palatable than a hash mixture, and possibly better physiologically.

In cases of chronic diarrhea, it is obvious that every effort should be made to establish the cause. In these cases, the frequent stools result in loss of essential elements of food and electrolytes. Wakefield and Welch recently have dem-

onstrated the high loss of fats and proteins in the stools of patients who have chronic ulcerative colitis. Sodium and calcium are lost at a rate well above normal. Hence, a basic principle in cases of chronic diarrhea is not to restrict but to increase the dietary, although avoiding excess residue. Far more harm is done by a too limited than by a too liberal diet. At the onset it is well to include 60 to 100 gm. of protein, such as beef, mutton, eggs, cheese, and small amounts of puréed vegetables in milk soup. Then the stewed fruits and vegetables should be added slowly. If a disease has been present for some time and may continue for an indefinite period, the diet must be generous and must sufficiently approach completeness to avoid malnutrition, as well as to protect against deficiency states. The principal vitamins are now available in concentrated form. Calcium, administered orally when the stomach is empty, supplements a diet low in milk.

If digestion of fat is faulty, the diet best tolerated is usually low in fat, fairly high in protein, and rich in carbohydrate.

In certain cases in which the diarrhea is attributable to some particular food or foods, elimination diets will have to be tried. It is not within the scope of this discussion to go into details of this phase of allergy but it should be borne in mind that many cases of chronic diarrhea, often diagnosed as purely functional in type, are actually attributable to some offending article of diet. Yet, as in all the other types of chronic diarrhea, the goal of a diet sufficient in essential food elements, as well as calories, must never be forgotten.

Summary

Certain general dietary principles can be applied to constipation and the more common types of diarrhea, but general, printed diet lists are inadvisable. The diet must fit the needs in the individual case. It is essential that an adequate, well balanced dietary be prescribed. Patients should be cautioned against following peculiar or unsound eating habits.

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THE RECOGNITION AND CONSERVATIVE TREATMENT OF HYDRONEPHROSIS*

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IN SO FAR as one can say that anything in medicine is always true, one can say in the broad sense that hydronephrosis is always due to urinary obstruction. To make such a broad statement one must include atonic or paralytic as well as mechanical obstruction. If unrelieved, such an obstruction sooner or later causes atrophy of the renal tissue. Therefore, when possible, the obstruction should be found and removed before the kidney is destroyed.

When the obstruction occurs in the lower part of the urinary tract, the hydronephrosis is bilateral, and may develop insidiously, going on to almost complete pressure atrophy of both kidneys with but few and slight symptoms referable to the kidneys. Removal of the evident primary obstruction in the lower urinary tract may give a clinical cure if the damage has not been too great. However, in the meantime, some secondary obstruction may develop higher up in the urinary tract, such as kinking of the ureteropelvic junction following release of tension on the overdistended pelvis and ureter. Such a secondary obstruction may persist after relief of the primary obstruction and may cause disappointment, if not recognized and relieved.

At the time that hydronephrosis is first recognized the primary and secondary obstructive factors may have become so complex that very careful study may be necessary to discover and evaluate them all. Often the patient is brought to his physician because of some secondarily developing renal ailment such as infection or calculus formation. Failure to care for all the obstructive factors has been one cause of failure in the conservative treatment of hydronephrosis. Even complete relief of a mechanical obstruction may fail when an associated or underlying neurogenic factor is overlooked. Von Lichtenberg,⁶ of Berlin, in 1929 reported that among eighty operations for renal obstruction the obstruction was of neurogenic origin in 27 per cent.

When hydronephrosis is suspected, a complete systematic examination should be made in order to discover and evaluate all the factors involved. One must not neglect the careful history and general physical examination, including genital and rectal examinations and urinalysis. A flat roentgenogram of the urinary tract, intravenous urograms, and even a cystogram and urethrogram may indicate the diagnosis, but will usually



Fig. 1, a.

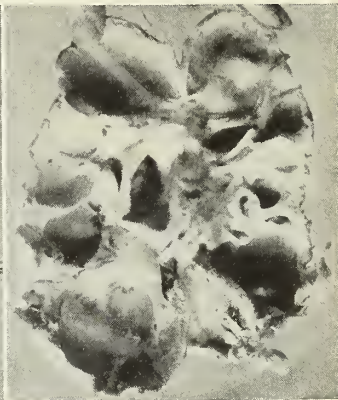


Fig. 1, b.

have to be corroborated and supplemented by the usual urologic study. Urethroscopy may disclose valves or strictures or prostatic hypertrophy. Cystoscopy may show a calculus, diverticulum, tumor or ureterocele. Ureteral catheters may encounter a calculus, stricture or tumor. If the catheter is opaque to x-ray it may suggest hydronephrosis by its wide curve or loop beyond the kidney shadow. A large amount of urine aspirated or running from the ureteral catheter would be pathognomonic. The functional dye test would be of value, although it must be remembered that an apparently poor function in an obstructed kidney has been known sometimes to improve greatly with drainage by the inlying ureteral catheter or nephrostomy tube. Finally, bilateral pyelo-ureterography or pyeloscopy, using supine and erect postures, if necessary, will clinch the diagnosis. Such retrograde urography will give detailed information not obtainable by the intravenous method, but occasionally one must depend entirely on the

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Fig. 2, a.



Fig. 2, b.



Fig. 2, c.

In Figure 2, b, note from the groove in the pelvic outlet that the ureter has been uncoiled; some of the fibrous bands at this point have been divided.



Fig. 3, a.



Fig. 3, b.

intravenous method when one is unable to catheterize the ureters. The complete diagnosis having been made, the treatment will depend upon the conditions found.

Simple unilateral or bilateral hydronephrosis, without or with only moderate infection, is often overlooked for years but can be recognized if one is alert. Evidence of mechanical obstruction is usually found at or near the ureteropelvic junction. There has been much controversy as

to the really primary causes and the secondary results of the obstructions. Abnormal renal mobility, aberrant vessels and other anomalies, fibrous bands, adhesions, kinks, inflammatory and congenital strictures, stones, tumors, and parasites have been found. Among the symptoms and signs in such cases may be:

1. Dull pain in the abdomen or flanks, usually not radiating downward but often affected by posture.
2. Attacks of acute pain, sometimes suggesting renal colic. During such attacks the kidney may be tender to lumbar percussion.
3. Mass in the flank, not always palpable.
4. Abnormal urinary findings: hematuria, pyuria or occasionally evidence of nephritis. The urine may be normal.
5. Reflex gastro-intestinal disturbances which in some cases completely overshadow the urinary symptoms.
6. After months or years of unrelieved distress, these patients may become quite neurotic.

The treatment of hydronephrosis may require treatment of an obstruction in the lower urinary tract. If the obstruction is in the ureter, passage of catheters or bougies may give relief. Obstructions at the ureteropelvic junction may be relieved by a properly fitted binder and pad with temporary postural treatment and a gain of weight by diet. In some, a temporarily indwelling catheter may be needed. In others, a nephropexy with or without temporary nephros-

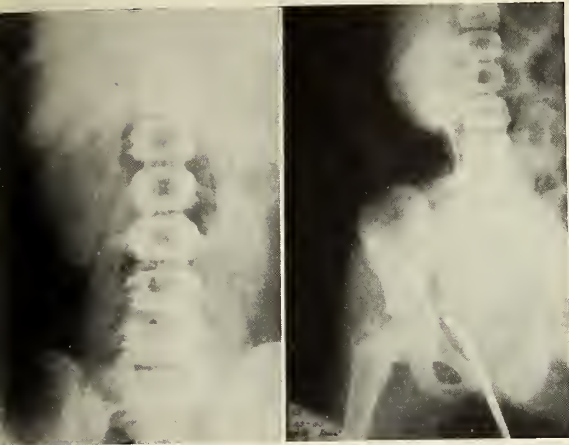


Fig. 4, a.

Fig. 4, b.

tomy drainage may be necessary to insure permanence of the relief. Nephropexy and nephrostomy are often used in conjunction with plastic operations.

Nephrectomy is indicated when one kidney has been largely destroyed and the other is normal. Hinman² recommends nephrectomy for even the small hydronephrotic kidney when the other kidney is normal, feeling that the damaged kidney will not regenerate when the other is normal. Keyes has said that one can not operate conservatively on materially infected kidneys. However, Quinby³ has said that "all surgery should be constructive wherever possible and safe, rather than destructive," feeling that one can never say what stresses the patient may undergo later. Sometimes the decision between nephrectomy and some conservative operation is a most difficult problem in surgical judgment. In a series of forty-seven conservative operations, von Lichtenberg⁶ was obliged to do secondary nephrectomy three times. Walters and Braasch⁷ reported one secondary nephrectomy in a series of ten conservative operations. One of my patients has had a secondary nephrectomy. The choice of operation is sometimes difficult. I feel that one should always be prepared to perform a conservative operation even in cases where preliminary study indicates that nephrectomy will probably be necessary. Of course, when both kidneys are affected, conservative treatment is obligatory; in fact, conservative surgery gives its best results in cases of bilateral hydronephrosis.

When conservative surgery is undertaken for

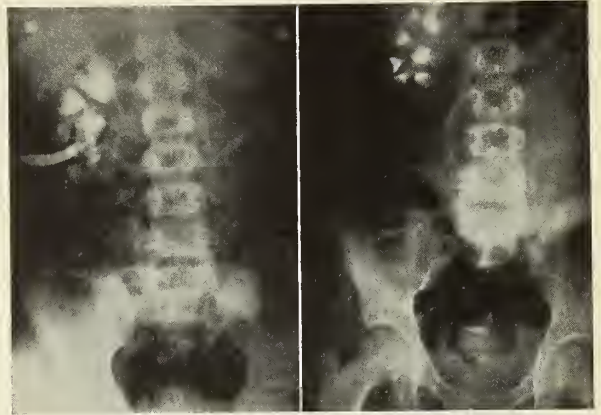


Fig. 5, a.

Fig. 5, b.

hydronephrosis, the type of operation must suit the individual case; a poor choice may vitiate the result though the operation be well performed. Among the methods used are:

1. Freeing of bands and adhesions and kinks with or without nephropexy.
2. Various plastic procedures at the uretero-pelvic junction such as the Heineke-Mikulicz or Finney incision or the procedure suggested by Arnold Schwyzer,⁴ in 1923.
3. Transplantation of the ureter to a more dependent and free part of the pelvis.
4. Plication of the pelvic wall.
5. Resection of the renal pelvis by one of various methods described.

Any of these procedures may be combined with nephropexy and with nephrostomy. Preliminary drainage by ureteral catheter or nephrostomy may improve the prognosis. For nephrostomy I have been well pleased with use of the method described by Cabot and Holland,¹ in 1932. Splinting of the upper ureter by ureteral catheter is often of value at time of operation. In any conservative operation for hydronephrosis one must insure relief of all obstructive factors if he is to avoid disappointment.

Illustrative Cases

Case 1.—Stricture of urethra, traumatic. A man, forty-seven years old, was admitted for an acute respiratory infection and uremia. He had fallen astride a barbed wire fence twenty-six years ago, and had bled from the urethra. He had not been treated then, but was treated with sounds seven years ago. Dysuria had been present for the last three months. I was able to pass filiform bougies and followers. The blood

urea nitrogen was 119.7 mgm. per 100 c.c. and the creatinine 5.8 mgms. He died from uremia and broncho-pneumonia. Autopsy showed urethral stricture, a thick-walled, badly infected bladder, bilateral



Fig. 6, a.

Fig. 6, b.

hydro-ureter, and bilateral infected hydronephrosis with a cortical abscess of the left kidney.

Case 2.—Hypertrophy of prostate. A man, eighty-four years old, entered the hospital in uremia and died from terminal broncho-pneumonia. Autopsy showed hypertrophy of the prostate, especially the middle lobe, and bilateral hydronephrosis and hydro-ureter.

Case 3.—Rectosigmoid carcinoma. A woman, thirty-three years old, had complained, for one year, of pain in the left lower abdominal quadrant radiating to the left lumbar region. Hydronephrosis and hydro-ureter due to pressure on the lower ureter were demonstrated by rapid drainage on catheterization of the ureter and by pyelo-ureterogram; injection of the sodium iodide solution reproduced the pain of which she had complained. Ureteral drainage completely relieved her pain for some time. Further investigation demonstrated an inoperable rectosigmoid carcinoma which later caused her death.

Note: In other similar cases in my series the carcinomas have originated in the bladder and uterus.

Case 4.—Pregnancy. A woman, eight months pregnant, with signs of urinary infection, was not relieved by the usual medical treatment. Urography showed hydronephrosis and hydro-ureter, with the ureteral catheter actually coiled in the ureter; the fetus was also shown. Complete relief of obstruction followed parturition.

Case 5.—Traumatic ureteral stricture. A young man was shot through the pelvic region in May, 1934, the bullet grazing the lower right ureter. In June, 1935, he returned with pain in the right flank. Ureteral catheterization demonstrated a stricture of the ureter,

and intravenous urography showed moderate right hydro-ureter and hydronephrosis. Repeated ureteral catheterization gave relief of pain, and urography in August showed neither hydronephrosis nor hydro-ureter.

Case 6.—Ureteral calculus. A man, twenty-nine years old, had repeated attacks of right renal colic. Urography showed right hydronephrosis and hydro-ureter with two non-opaque calculi in the lower part of the ureter. Ureterolithotomy gave relief.

Case 7.—Horseshoe kidney. A man, fifty years old, had pain in the left side of the abdomen for fourteen years, worse on standing and walking, relieved by sitting or lying down, and associated occasionally with hematuria, which findings led to the urologic examination. The wide loop of the catheter beyond the kidney shadow suggested hydronephrosis, and the pyelogram proved it and localized the stone shadows. The pyelography also clinched the diagnosis of horseshoe kidney. The hydronephrosis may have been due to pressure on the ureter by the renal isthmus rather than to the calculi. Left heminephrectomy gave complete relief.⁵

Case 8.—Vessels to lower pole of kidney. A man, twenty-two years old, had severe attacks of pain in the left lower quadrant for at least eleven years. As a child he learned to lie on a hot air vent for relief when he had the attacks. He was seen by various physicians who had no idea of the source of the trouble until one physician felt a mass in the left flank and requested a urologic study. I found an extreme degree of hydronephrosis of the left kidney with almost no function, necessitating nephrectomy (Figs. 1, a and b).

Case 9.—Fibrous bands distorting the ureteropelvic junction. A boy, thirteen years old, had pains in the left side of the abdomen about every three months, associated with vomiting. A pediatrician had treated him for "spasmodic intestine." During the last eight months he had three attacks of pain, in the last of which the pain reached the back for the first time. A barium enema demonstrated displacement of the transverse colon upward, and of the descending colon forward and laterally. Intravenous urography failed to show any excretion from the left kidney. Retrograde urography showed a normal left ureter and a kink at the ureteropelvic junction, with practically no skiodan reaching the renal pelvis (Fig. 2, a). At operation the ureteropelvic junction was tightly coiled on itself and tightly bound down by fibrous bands; the kidney itself was a mere shell and had to be removed (Fig. 2, b and c).

Case 10.—Fibrous bands and adhesions and very small anomalous vessels. A woman, twenty-two years old, had had pain in the right side at the age of fifteen years. Two laparotomies had been performed without relief of the pains. I demonstrated a hydronephrosis (Fig. 3, a), but she had three attacks of pain in nine months while under non-operative treatment (binder and pad, dietary regulation and other measures), and operation was finally performed. Release of adhesions

and fibrous bands over the renal pelvis and division of very small blood vessels to the lower renal pole completely relieved the obstruction; nephropexy completed the operation. A pyelogram, ten months later (Fig. 3, *b*) showed the renal pelvis reduced in size with free drainage. She had no more pain.

Case 11.—Anomalous vessels to lower pole of kidney. A girl, six years old, first seen by me in September, 1933, had had attacks of abdominal pain for about one year. A severe attack in July, thought to be an intestinal upset with pain and mass in the right abdomen, was relieved by elevation of the foot of the bed. When pain and tender mass recurred with fever, her physician had an intravenous pyelographic study which showed a large non-functioning right kidney and a normal left kidney. Cystoscopy and retrograde pyelography by me showed a large, infected right hydronephrosis with obstruction at the uretero-pelvic junction. After twelve days of drainage by ureteral catheter, the right kidney was explored. The cortex being fairly well preserved, a plastic operation on the renal pelvis was done by the technic of Young and Didusch.⁸ Nephropexy and nephrostomy by the technic of Cabot and Holland completed the operation. After a convalescence made stormy by the infection which had been previously recognized, the patient made a good recovery and is in good health. Figure 4 shows the condition before operation: (*a*) intravenous and (*b*) retrograde pyelography. Figure 5 shows (*a*) the condition soon after operation; (*b*) the improvement evident one year later—pyramids more prominent, calices smaller, no dilation of pelvis.

Case 12.—Anomalous vessels to lower pole; failure of conservative operation because of persistent pyelonephritis. A woman, forty-seven years of age, first noticed hematuria and urinary infection in 1929 during an attack of upper respiratory infection; an operation on the right kidney was then advised but refused. The urinary infection and hematuria recurred with each recurrence of respiratory infection, though it was temporarily relieved after tonsillectomy, in 1931. In March, 1934, she began to have dull pain in the right

lumbar region with hematuria. The hemoglobin reading was 51 per cent. Cystoscopy, on April 13, 1934, showed bloody urine from the right ureter, and cultures showed infection in the right kidney. Pyelography (Fig. 6, *a*) demonstrated a severe degree of right hydronephrosis and a normal left kidney. At operation, on April 18, 1934, there was difference of opinion as to the advisability of trying to save the badly damaged kidney, but I made the attempt. Because of the shortness of the renal pedicle it was necessary to modify the Young-Didusch procedure by doing all the resection on the posterior aspect of the renal pelvis. It was found that the modification accomplished the desired result in less time and with less difficulty than the originally described procedure. Nephrostomy was done by the Cabot-Holland method, the ureteropelvic junction being splinted by a ureteral catheter brought out through the nephrostomy tube. Operation was completed by nephropexy. The patient recovered well, the renal function improved, and the drainage from the kidney was satisfactory (Fig. 6, *b*). However, the pyelonephritis persisted (as Hinman warns it will do when one kidney is badly damaged and the other normal) and nephrectomy was finally done in November, 1934, with complete relief of symptoms and complete clearing of the urine. At nephrectomy, the right kidney cortex was badly infected, but drainage from the renal pelvis was not obstructed.

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ADVANCES IN GENERAL ANESTHESIA*

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GENERAL anesthesia may be produced by the inhalation of any one of several anesthetic agents; for example, nitrous oxide, ethylene, acetylene, cyclopropane, or ether. Oxygen must be supplied for two purposes: first, to carry on metabolism, and thus support life; second, to dilute the toxic concentration of the anesthetic agent to one which will produce sur-

gical anesthesia. With nitrous oxide, little more than enough oxygen to prevent asphyxia may be administered without interfering with the depth of anesthesia. When a more potent agent like ethylene or acetylene is employed, more oxygen than is required to support life must be supplied to dilute the anesthetic gas and thus prevent the development of too profound anesthesia. Therefore, in order to maintain anesthesia, the patient must breathe a mixture that contains the anes-

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thetic agent, enough oxygen to maintain life, and enough extra oxygen to dilute the anesthetic agent properly. The depth of anesthesia may be governed by varying the percentage of oxygen in the mixture.

With the desired depth of anesthesia estab-

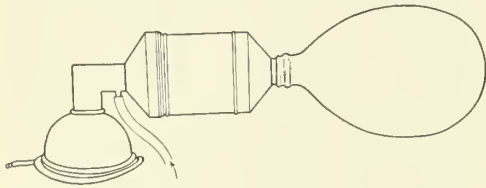


Fig. 1. Carbon dioxide absorption system of the to-and-fro type (Waters).

lished, it would be possible to maintain this stage of anesthesia by having the patient breathe the same mixture over and over again, were it not for the development of anoxemia, and the accumulation of the carbon dioxide exhaled by the patient. The anoxemia might be prevented by adding sufficient oxygen to maintain metabolic function but the patient's condition would still be unsatisfactory because of the labored breathing that is stimulated by the presence of the excess of carbon dioxide. With the older methods of administration, this carbon dioxide which accumulated was allowed to escape, but in order to create a satisfactory escape, a continuous flow of the anesthetic gas from the gas machine, and sufficient oxygen to dilute it, was necessary. This constant wasting of gases for the purpose of carrying off the accumulated carbon dioxide entailed considerable expense. New gas machines were devised and methods of administration were modified, with the object of reducing this expense. Intermittent flow machines, which would automatically shut off the flow of new gases during exhalation, were introduced. Fractional rebreathing permitted a further reduction in cost per hour of anesthesia.

During the usual administration, the gases pass from the supply tanks, which are attached to the gas machine, to the mixing chamber. From the mixing chamber, the gases pass to the rebreathing bag and thence through a flexible tube of large caliber to the face mask. If the rate of flow of gases into the mixing chamber is equal to the patient's minute respiratory volume, the patient's breathing will be very quiet because no carbon dioxide will be inhaled; the flow of gases will be large and the cost of anesthesia great.

If the minute volume flow from the machine is half the minute respiratory volume, half of each exhalation will remain in the mask, delivery tube, and rebreathing bag, and fractional rebreathing will be possible. The minute volume flow might be further reduced in relation to the minute

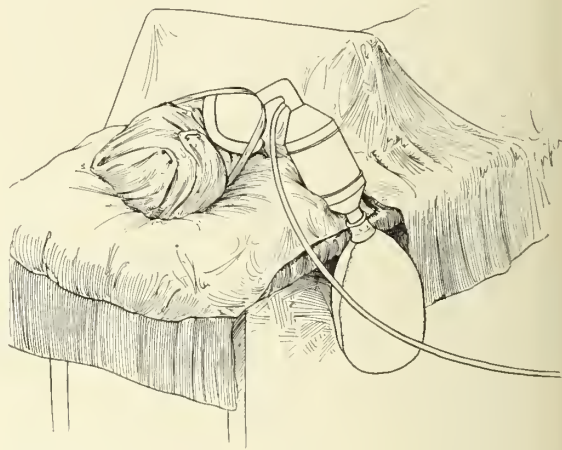


Fig. 2. Position of the patient when the mask of the absorption system is applied to the face.

respiratory volume but there is a limit beyond which gases cannot be conserved in this manner. A flow of anesthetic gas and oxygen in the proper percentage to maintain the desired level of anesthesia must be constantly maintained to act as a vehicle in which the excess carbon dioxide may escape through the exhaling valve.

It remained for Jackson to devise a method whereby the excess of carbon dioxide was removed by chemical means. He found that soda lime (sodium and calcium hydrate), which he introduced into the rebreathing system, would remove the carbon dioxide. Waters was the first to apply this method in clinical practice. Gas machines that are adapted to this method are now on the market. Two types of apparatus are advocated. One is known as the to-and-fro type and the other is of the circuit type. Either type may be attached to a gas machine which is capable of providing a steady flow of oxygen at rates as low as 200 c.c. per minute.

In the to-and-fro type (Fig. 1), the canister, which contains 500 gm. of Wilson's soda lime of 4 to 8 mesh, is interposed between the rebreathing bag and the mask. With each respiratory cycle, the gases pass through the soda lime twice. The canister is made with a slip joint at each end. It may be removed from the system during induction of anesthesia or when one

wishes to stimulate deep respiration by allowing carbon dioxide to accumulate. One canister of soda lime is sufficient for six to ten hours of anesthesia. A rubber hose carries fresh gases from the machine into the rebreathing system, through a connection which opens immediately



Fig. 3. Carbon dioxide absorption system of the circuit type.

above the mask. Figure 2 indicates the position of the patient and rebreathing system during the administration of an anesthetic.

With the circuit type of apparatus (Fig. 3), the canister is attached to the gas machine and is connected to the mask by two rubber tubes of large caliber. The rebreathing bag is attached to the lower end of the canister. By means of valves, the direction of flow of the gases may be controlled. On inspiration, the flow is directed from the rebreathing bag to the patient, and on exhalation, the gases are directed through the soda lime on their way to the rebreathing bag. Thus, a circuit is established. By means of a shunt valve, the anesthetist can cut the soda lime out of the circuit at will. A schematic drawing of the circuit is shown in Figure 4. The operation of the circuit apparatus is similar in basic principle to that of the to-and-fro type.

For induction of anesthesia, the mask is placed over the patient's face while the gases are flowing at the rate to which the anesthetist is accus-

tomed. The exhaling valve should be opened and the gases should be expressed from the rebreathing bag in order to flush out the nitrogen which was in the patient's respiratory tract. The mask should then be fitted very snugly to the face and fastened with a retaining strap. If

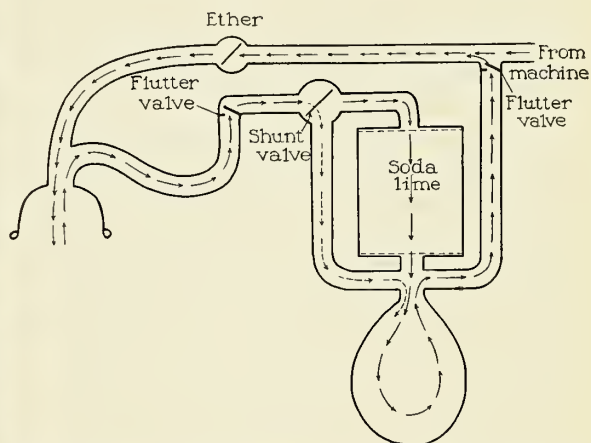


Fig. 4. Carbon dioxide absorption system of the circuit type (schematic).

this tends to make respiration difficult, it is best to slip in an artificial airway and then restrap the mask over the face. When respirations are regular and fairly deep, and as the desired plane of anesthesia is approached, the anesthetist may change to the carbon dioxide absorption technic. The position of the shunt valve is changed to direct the gases through the soda lime; the escape valve is closed; the flow of anesthetic gases is discontinued; and the flow of oxygen is reduced to between 200 and 400 c.c. each minute. If all connections are tight and if the flow of oxygen exactly meets the patient's requirements, no further adjustment should be necessary and no further flow of anesthetic gases should be needed to maintain anesthesia throughout the operation. If the anesthetist is unable to maintain the system leak-free, the breathing bag will deflate but there will be little change in the depth of anesthesia. A slow flow of the anesthetic gas may be necessary to compensate for the escape. In this case, it will be necessary to add sufficient oxygen to dilute this new gas in order to retain the desired level of anesthesia. If the anesthetist fails to provide sufficient oxygen to satisfy the patient's metabolic requirement, the diluting oxygen in the system will be depleted, the rebreathing bag will slowly deflate, the plane of anesthesia will be deepened, and cyanosis will de-

TABLE 1. FLAMMABILITY LIMITS, PER CENT BY VOLUME

Anesthetic	Atmosphere	Lower	Upper	Authority
Ether	Air	1.3	25.9	Jones and Kennedy
Ethylene	Air	3.0	28.6	Jones and Kennedy
Cyclopropane	Air	3.0	8.5	Buchman and Wardell
Ether	Oxygen	1.7	39.5	Jorissen and Ongkiehong
Ethylene	Oxygen	3.1	79.9	Jones and Kennedy
Cyclopropane	Oxygen	2.5	50.0	Buchman and Wardell

velop. The diluting oxygen should be increased immediately by a temporary rapid flow of oxygen. The untoward condition may be prevented from occurring again by increasing slightly the steady flow of oxygen. This change must be slight; otherwise, the flow will more than meet the metabolic requirements of the patient, the bag will gradually distend, and the depth of anesthesia will be decreased. With these circumstances presenting, the exhaling valve should be opened momentarily and the excess volume of gases should be allowed to escape. A brief but rapid flow of anesthetic gas should be turned on to reestablish the proper anesthetic mixture, and the flow of oxygen should be slightly reduced. When the soda lime becomes exhausted, carbon dioxide accumulates and causes a gradual increase in the depth of respiration. If the anesthetist flushes out the carbon dioxide by the addition of fresh gases and, as a result, the patient's breathing becomes quiet, proof is thus supplied that exhaustion of the soda lime has occurred. With the to-and-fro type of apparatus, the canister may be changed but with the circuit type of apparatus, unless the canister is of the double chamber type, it will be necessary to complete the operation with the gases constantly flowing and shunted around the canister.

Advantages of the Carbon Dioxide Absorption Method

Breathing is usually quiet. The patient's energy is conserved and the surgeon finds exposure facilitated. It is better to produce quiet breathing by removing carbon dioxide, the natural stimulus to deep respiration, rather than by partially paralyzing the respiratory center with ether. The exhaled gases are at body temperature and are saturated with moisture. Re-inhalation of warm gases conserves the patient's body heat and, because the gases are moist, the hazard of explosion from static electricity is re-

duced. Because less gas escapes with this method than with any other, the danger of explosions from external sources is reduced to a minimum. Reduction in danger of explosion does not constitute an excuse for any relaxation of precautionary measures employed to prevent explosions. The use of open flames, high frequency equipment or cautery should not be permitted when ethylene or cyclopropane is being administered, and the relative humidity of the air in the operating room should be maintained at a high level. The warm gases do not stimulate the mucous membranes of the upper part of the respiratory tract to the production of excessive secretion. For this reason, an efficient airway may be maintained with less difficulty than formerly, and less ether is required to maintain anesthesia. Vomiting after operation is minimal and this is probably because less ether-laden secretion reaches the stomach. The volume of gases which is used when the carbon dioxide absorber method is employed, is considerably less than when the constant flow method is used. The possible saving is great and the use of gas anesthesia may now be extended to individuals to whom it was formerly economically impossible to administer gases. The carbon dioxide absorption method has made possible the use of the new and more expensive gas, cyclopropane.

Cyclopropane

The anesthetic properties of cyclopropane were discovered and reported by Lucas and Henderson of Toronto, Canada, in 1929. Its first extensive clinical application was by Waters and Schmidt. Since the gas is represented by a closed ring formula it is probably rather inert. It is a colorless gas, which is heavier than air, and which has a rather sweet odor. Cyclopropane is explosive when its concentration in air exceeds 3 per cent by volume. Its upper limit of inflammability in air is reached when the concentra-

tion is 8.5 per cent by volume. The limits of inflammability of cyclopropane in oxygen are from 2.5 per cent to 50 per cent by volume. Limits of inflammability of other anesthetic agents are outlined in Table I. In clinical practice^{1,3,4,9} the volume of cyclopropane in oxygen seldom need exceed 20 per cent. The same precautions, therefore, must be taken to prevent an explosion of cyclopropane as would be taken to prevent an explosion of ethylene. Because the gas is expensive, it is necessary to employ the carbon dioxide absorption method of administration in order to bring the cost within reasonable limits. In my experience, a tank containing 50 gallons of gas and costing \$25.00 has provided for thirty-four hours of anesthesia.

Induction of anesthesia with cyclopropane is rapid and the patient does not exhibit a period of excitement. Production of mucus is not a factor. Stridor does not seem to be a prominent feature. Cyanosis does not occur unless mechanical obstruction is present. The lid reflex quickly becomes inactive.

As light surgical anesthesia is reached, movement of the eyeball ceases. Respiration is quiet and inhalation is shallow when anesthesia is profound. Blood pressure does not seem to be unduly disturbed. As deep surgical anesthesia is approached, evidence of respiratory depression may be observed and apnea may occur without the appearance of cyanosis. The degree of relaxation approaches that produced by ether and is better than that produced by ethylene. Where relaxation is not adequate, addition of a minimal amount of ether vapor will produce it. This is preferable further to increase of the concentration of cyclopropane, which may be associated with the development of an irregular pulse rate.

Recovery is rapid and is usually accompanied by little nausea. Vomiting during the first post-operative day is not excessive and is less than that which usually is encountered when ether has been used. Headache of moderate degree has been encountered in a few instances. Pulmonary complications occur less frequently after cyclopropane has been used than they do following the administration of ether.

Cyclopropane shows promise of displacing ethylene, at least for certain types of operation. It is particularly valuable when relaxation is needed in cases in which ether is contraindicated

because of some condition within the respiratory system. The gas is useful in cases in which patients are suffering from severe cardiac damage; in these cases, it is advisable that a period of excitement with struggling be avoided. Cyclopropane produces satisfactory anesthesia for surgical procedures involving structures within the thorax. Patients undergoing operations for chronic empyema or for removal of intrathoracic tumors have restricted breathing capacity. The high concentration of oxygen, which may be given with cyclopropane, insures adequate oxygenation. It is because of this factor that cyclopropane also is advised for operative obstetric procedures. Cesarean section may be undertaken with this type of anesthesia. Relaxation is adequate, the baby receives plenty of oxygen, the uterus contracts readily after the placenta has been removed, and hemorrhage is not excessive.

The place cyclopropane will occupy in the list of anesthetic agents is not known. The problem is for the chemist to find an inexpensive method of producing the gas in pure form on a commercial scale. The gas represents an improvement over ethylene in that it is less explosive and it is capable of producing more profound relaxation without the development of cyanosis. Its properties seem to offer the possibility of widespread application of cyclopropane in both operating and delivery rooms.

Intratracheal Anesthesia

There is one essential which must be maintained during the administration of anesthetic agents, particularly when the carbon dioxide absorption method is employed. This is the maintenance of an efficient airway. Simple methods may be employed for this purpose.^{7,8} The jaws should be held forward, or, if necessary an artificial airway may be inserted to hold up the tongue. The most efficient method of establishing an airway is to insert an intratracheal tube. Tubes of several types are available, but in my experience a Magill tube has proved most useful. A Magill tube is prepared from ordinary connector rubber tubing. For the average adult a tube which has an inside diameter of 1 cm. ($2/5$ of an inch), and which is 26 cm. (about 10 inches) long, is cut and steamed into a curve (Fig. 5). The bevel on the tracheal end of the tube is cut in the anteroposterior plane to facilitate its introduction between the vocal cords.

The catheter may be introduced by way of the nose or mouth. The curve makes it feasible to introduce the catheter by the nasal route and pass it into the trachea without the aid of a laryngoscope, in approximately 70 per cent of

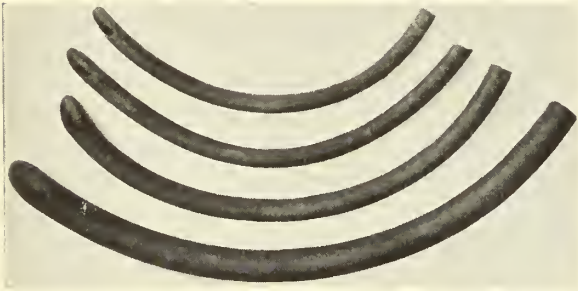


Fig. 5. Intratracheal catheters, Magill type, of several sizes, showing the curve and the beveled tracheal end.

cases. In case of difficulty, a laryngoscope may be introduced. The glottis can then be visualized and the tube may be guided into the opening with the aid of the blade. Intubation through the mouth, with the aid of a laryngoscope, is easy to accomplish provided relaxation is satisfactory.

Immediately after a tube has been inserted into the trachea, it is fixed in position by means of adhesive tape. Anesthesia may be continued by the open drop method or gases may be administered by placing a mask over the patient's face (Figs. 6 and 7). For operations involving the head, face, or neck, it may be advantageous to deliver the gases into the intratracheal tube by means of a direct connection (Fig. 8). The operative field is not encroached on by the face mask, if this method is employed.

General advantages and application of the intratracheal method.—Insertion of an intratracheal tube insures an adequate airway throughout the operation. The method permits constant control of depth of anesthesia, and the surgical stage can be maintained with minimal amounts of ether, nitrous oxide, ethylene, or cyclopropane. The method is warranted for operations on the spinal cord or cerebellum, because the operative risk may be great and the prone position makes aëration difficult with other methods. Oxygen under pressure may be delivered directly into the catheter and artificial respiration may be instituted without the danger of gastric distention. For operations involving structures within the thorax, the method provides for complete control of intrapulmonary pressure. The

exposed lung may be allowed to collapse or may be distended at will. For surgical procedures within the upper abdomen, adequate relaxation can be produced by the intratracheal administration of gases and ether. Quiet, unobstructed res-

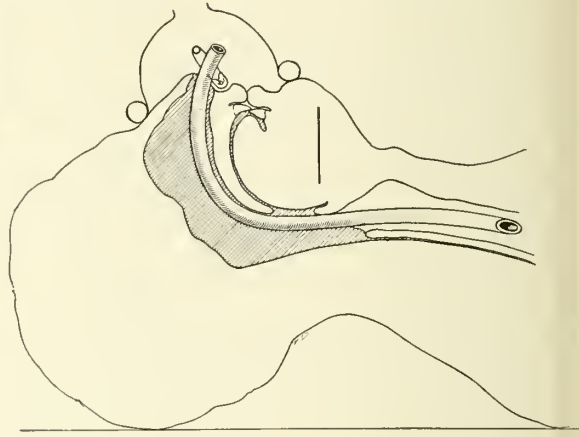


Fig. 6. The intratracheal catheter, introduced through the nose, is transfixed with a safety pin in order to prevent the tube disappearing within the nostril.

piration facilitates exposure. The intratracheal method of administering anesthetic agents is adaptable to many purposes. It is a method which an anesthetist should be prepared to employ should an emergency necessitate it.

Intravenous Administration of Barbiturates

An alternative method to intratracheal anesthesia has recently been gaining in popularity for short operations, particularly about the head and neck. I refer to the intravenous administration of recently discovered derivatives within the barbituric acid series.^{6,12}

The barbiturates, sodium amytal and pentobarbital sodium, have been available for intravenous injection for some years, but have not gained wide acceptance as useful anesthetic agents because the relaxation which they have produced has not been adequate, and because recovery of consciousness has been delayed and frequently has been associated with marked restlessness. Within recent years, search for a short-acting barbiturate has proved successful. One of the new derivatives to be given clinical trial in this country is sodium n-methyl-cyclohexenyl methyl malonyl urea (evipal soluble). Another, sodium ethyl 1-methyl butyl thiobarbituric acid, not yet on the market, is designated by the company as number 8064 or pentothal sodium, and contains a

sulphur radical. It is considerably more potent than is the former drug. Both drugs are supplied in crystalline form in ampules, along with companion ampules containing 10 c.c. of sterile distilled water. One gram of either drug is dis-

speaking, the maximal dose. Consciousness is usually regained in from ten to fifteen minutes after administration of an average dose. The patient can talk at this time but he will be sleepy and will remain quiet if undisturbed.

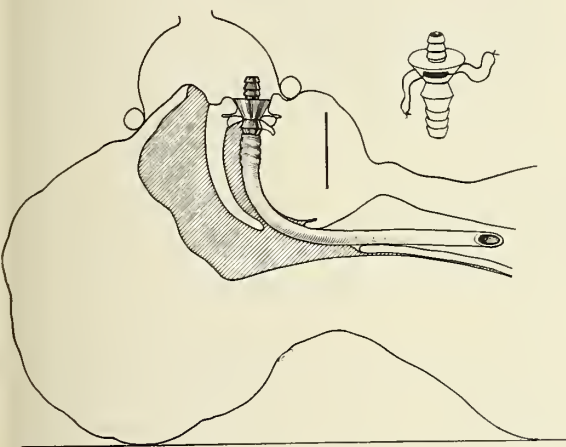


Fig. 7. Constriction of the intratracheal catheter is prevented by inserting a metal piece between the patient's upper and lower incisor teeth.

solved in 10 c.c. of distilled water, in preparation for intravenous injection.

The patient is usually given $1\frac{1}{2}$ grains (0.097 gm.) of pentobarbital sodium one hour before the time set for operation, and morphine, grain $\frac{1}{2}$ (0.01 gm.) with atropine sulphate, grain $\frac{1}{150}$ (0.0004 gm.) are administered subcutaneously a half hour later. The patient is brought to the operating room and the operative field is prepared and draped. An arm is also prepared for intravenous administration of the barbiturate. Fresh 10 per cent solution of sodium ethyl 1-methyl butyl thiobarbituric acid may be injected at the rate of 1 c.c. in fifteen seconds while unconsciousness is being produced. Usually, not more than 2 or 3 c.c. are needed to produce this effect. Injection is then halted until the patient shows some evidence of reaction. Injection is then resumed; a small amount, 0.5 c.c., is administered intermittently throughout the operation, to maintain anesthesia at the desired level. The dose is regulated entirely by the effect produced and is not calculated on a basis of milligrams per kilogram of body weight.

The majority of patients are asleep in one minute. The operation may be begun shortly after unconsciousness is obtained. One gram of pentothal sodium in 10 c.c. of water is, generally

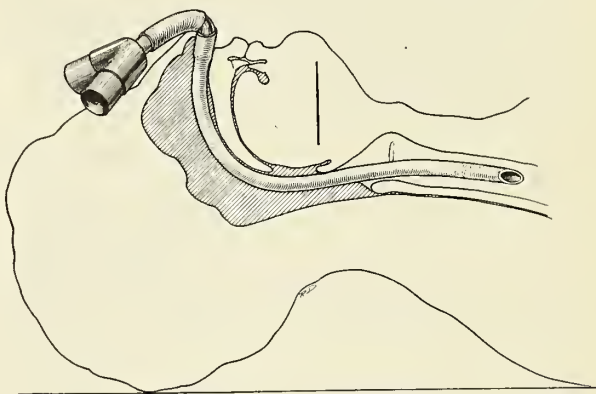


Fig. 8. Intratracheal catheter is directly connected to the gas machine by means of connectors and a catheter adapter.

Like other barbiturates, pentothal sodium is capable of depressing the respiratory center. Too rapid administration will produce temporary respiratory arrest. The drug is very rapidly destroyed in the body and three or four thrusts over the lower ribs usually will be sufficient to produce aëration. Should the condition persist, administration of oxygen, 90 per cent, and carbon dioxide, 10 per cent, under pressure, will relieve any cyanosis and maintain the patient's metabolism until the drug is detoxicated.

Pentothal sodium has proved satisfactory for short operations such as incision of abscesses, extraction of one or two teeth, enucleation of an eye, puncture of an eardrum, cystoscopic examination, or for the application of dressings to painful wounds. It is not indicated when relaxation of abdominal muscles is essential. Neither pentothal sodium nor evipal soluble, unlike sodium amytal or pentobarbital sodium, can be regarded as basal narcotics. Their action is so fleeting that they cannot be employed to produce prolonged sleep prior to operation. Both drugs, but particularly pentothal sodium, produce satisfactory anesthesia for minor surgical procedures or for short operations during which slight reflex movement will not interfere with progress of the procedure.

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POSTPARTUM HEMORRHAGE*

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THE consideration of postpartum hemorrhage as a serious complication of labor and the puerperium becomes obvious when one studies the recently published figures of the United States Department of Labor on maternal deaths. These figures show that about 5 per cent of maternal deaths are due to postpartum hemorrhage, excluding hemorrhage caused by placenta previa and premature separation of the placenta. The statistics from the State of Minnesota will show about this same incidence.

It must be admitted that these figures are too high, and that much can be done to reduce maternal deaths from this cause by the application of a few well accepted principles based upon the anatomical and physiological characteristics of the puerperal uterus.

The commonly accepted causes of postpartum hemorrhage in the order of frequency are:

1. The improper conduct of the third stage of labor.
2. The atonic uterus.
3. Lacerations of the cervix uteri and the birth canal.
4. Retained secundines.

The proper conduct of the third stage of labor depends upon a full appreciation of the anatomy and physiology of the puerperal uterus and placenta and the mechanism of separation of the placenta and membranes from the uterine wall. A

review of this stage of labor seems necessary at this time.

Immediately after the birth of the baby, the uterus contracts so that the fundus lies several centimeters below the umbilicus. At this time there is beginning retroplacental bleeding which forms a lake of blood between the placenta and the uterine wall, and as the blood accumulates it raises the placenta from its attachment to the uterus and permits it to fall into the lower uterine segment. With a normally acting uterus, there is little if any bleeding during this stage. The evidence of separation of the placenta is the secondary rise in the height of the uterus, further protrusion of the umbilical cord from the vagina, and a slight increase in external bleeding. When these signs become evident, the accepted procedure is to express the placenta manually.

With this physiologic process of placenta separation in mind, the management of the third stage of labor logically follows.

The procedure we have adopted at the Minneapolis General Hospital consists in giving one cubic centimeter obstetrical of pituitrin intramuscularly immediately *after the baby is delivered*, provided the patient has shown no signs of toxemia or does not have a systolic blood pressure in excess of 150 mm. of mercury. The hand is placed upon the lower abdomen to determine the state of uterine contraction. If bleeding is moderate or severe, only firm pressure is made. Vigorous massage is purposely avoided at all times. If an episiotomy or laceration is

*From the Department of Obstetrics and Gynecology of the University of Minnesota and the General Hospital, Minneapolis. Read before the meeting of the Southern Minnesota Medical Association, Austin, Minnesota, August 26, 1935.

to be repaired, it is done before the placenta is expressed. This is a good procedure, as it keeps one otherwise occupied rather than making an effort to express the placenta before it has separated. When the uterus shows signs of placental separation, the placenta is expressed though it occurs during the time the repair is made. Following placental delivery, one cubic centimeter of ergot is given intramuscularly, and an ice bag is placed on the lower abdomen, to further aid uterine contraction.

We have found the foregoing method very satisfactory, as during the past five years, in 7,547 patients delivered, there were no deaths from this cause and the following measured blood losses were obtained:

50-100 cubic centimeters.....	3549	48.3%
1-200 cubic centimeters.....	1984	26.2%
2-300 cubic centimeters.....	936	12.4%
3-400 cubic centimeters.....	482	6.3%
4-500 cubic centimeters.....	233	3.08%
5-600 cubic centimeters.....	126	1.67%
6-700 cubic centimeters.....	70	.92%
7-800 cubic centimeters.....	45	.59%
8-900 cubic centimeters.....	28	.37%
9-1000 cubic centimeters.....	16	.21%
1000 plus cubic centimeters.....	99	1.31%
No record	41	.54%

We believe that the pituitrin plays an important part for two reasons. First, it keeps the uterus in contraction, producing a constriction of the retroplacental vessels, and, secondly, it shortens the third stage of labor to an average of three minutes, about one-third of the usual duration. Statistically, there seems to be a correlation between the duration of the third stage of labor and the amount of blood lost. This relationship seems to be a direct proportion between the amount of blood lost and the time the placenta is retained.

The question arises as to the pituitrin producing hour-glass contraction and retention of the placenta. We believe this objection is theoretical, as this condition has not occurred with any greater frequency than in a similar group of patients where no pituitrin was used after the first stage of labor.

Massage of the uterus tends to cause an abnormal condition, especially if a partial separation of the placenta is present, which prevents the formation of a retroplacental lake of blood, interferes with normal separation and favors retention of the placenta. Thus it seems much safer to dispense with uterine massage, and to make only firm pressure and aortic compression

in patients who have poor uterine action and who continue to bleed.

The mechanism of separation of the placenta, whether that of Schultz or Duncan, has an influence upon the amount of bleeding. Statistical studies show that the Duncan mechanism predisposes to a greater blood loss. The recognition of this mechanism is of clinical importance. Generally, in the absence of severe cervical or vaginal lacerations, the placenta separating by this mechanism will show slow continuous bleeding, the amount of which will vary in the individual patient. Constant vigilance is necessary, and if the bleeding becomes alarming Credé expression is necessary. If the uterus can be maintained in tonic contraction by its own irritability or augmented by pituitrin, the bleeding from this method of separation can be greatly reduced.

The expression of blood clots from the uterus one hour after delivery is an excellent means of preventing further bleeding. This empties the uterus and restores its irritability efficiently.

The atonic uterus often leads to the most severe and profuse postpartum hemorrhage. This type of uterus is associated with primary and secondary inertia, in which there is greatly diminished or total lack of contractile power of the uterus. Multiple pregnancy and hydramnios which lead to excessive uterine distention, and excessively large babies, malpresentation and pelvic contractions which predispose to long hard labors leading to the depletion of uterine energy, result in exhaustion and often complete failure of contractile power.

The prophylactic consideration of atony of the uterus is of the greatest importance. The diagnosis is made by the character of the uterine contractions, which are infrequent, short in duration and inefficient. There is often severe subjective pain, and if the hand is not placed on the abdomen and the character of the contractions determined, one will often be misled as to the actual condition.

Successful treatment is carried out by rest and high caloric food intake to allow repletion of uterine energy. Stimulation may be necessary after a rest period. In short, it is necessary to nurse the uterus along until spontaneous delivery occurs or operative delivery is advisable. It must always be remembered, that the uterus must have contractile power following delivery, in

order to avoid serious blood loss. Forceps or version are formidable procedures when the uterus is inert and should not be done unless the uterus can be felt to have some contractile power.

Lacerations of the cervix uteri and birth canal are frequently seen in very rapid spontaneous delivery, and following operative procedures as manual dilatation of the cervix, forceps deliveries, and version. Depending upon the extent of the injury, the bleeding will vary greatly in amount. Attention is called to bleeding from this cause when there is a continuous blood loss in spite of a well contracted uterus. In such instance, the accepted form of treatment is exposure of the cervix and birth canal and ligation of the bleeding vessels.

Retention of portions of the placenta or membranes occasionally gives rise to serious hemorrhage. Large portions often interfere with uterine contractions and result in continuous bleeding. Inspection of the placenta and membranes will enable one to estimate the amount of retained tissue, which if large in amount and producing severe bleeding must be removed manually. Small amounts of tissue which are retained with no bleeding can usually be left alone to be passed later with the lochia.

We must always keep in mind, in the face of alarming hemorrhage, the treatment of shock which so often occurs. This consists of elevation of the foot of the bed, stimulants, intravenous saline, glucose or gum acacia in the order

of their accessibility, and, finally, transfusion of whole or citrated blood, the most effective of all recognized procedures to replace blood loss and maintain the patient's resistance throughout her lying-in period.

Summary and Conclusion

Postpartum hemorrhage is a frequent cause of maternal death. The careful conduct of the third stage of labor, the avoidance of uterine manipulation and the intelligent use of oxytocic drugs will reduce the amount of bleeding following the delivery.

The expression of blood clots one hour after delivery will reduce the amount of blood lost early in the puerperium.

The atonic uterus is most dangerous from the standpoint of hemorrhage. Rest, stimulation and repletion of its energy by means of oxytocic drugs are prophylactic safeguards for this condition.

Birth injury of the cervix uteri and birth canal may lead to alarming hemorrhage. They should be recognized early and treated by ligation of bleeding vessels and repair.

Inspection of the placenta and membranes is necessary. Large retained portions leading to continuous bleeding should be removed manually.

In all cases of alarming hemorrhage all preparation should be made for the treatment of shock, the most effective method being transfusion of whole or citrated blood.

More Nostrums in Retrospect

The Bureau of Investigation submits the following brief statements regarding products that have previously been dealt with in more detail in *The Journal*: *Laxative Bromo Quinine*.—The A. M. A. Chemical Laboratory analyzed this product in 1915 and reported that each tablet contained as its essential ingredients 2 grains of acetphenetidin, 1/5 grain of caffeine, 2/5 grain of quinine or cinchona alkaloids, with aloes or aloin as a laxative. The 1935 trade package declares—as the law requires—that each Laxative Bromo Quinine tablet contains one grain of acetanilid! *Murine*.—From an analysis made in the A. M. A. Chemical Laboratory in 1908, the chemists concluded that Murine was essentially a water solution of borax (about 12 grains to the fluid ounce) containing a trace of berberine or some golden seal preparation. *Western Medical Corporation*.—The analysis made of the so-called treatment for epilepsy put out by this concern

when it was known as the Western Medical Association, showed its essential ingredient to be phenobarbital (luminal). There were also some so-called digestive tablets and a laxative. *Nurito*.—From an analysis made by the A. M. A. Chemical Laboratory in 1912, Nurito was found to consist of milk sugar, phenolphthalein and amidopyrine (pyramidon). In 1914 federal chemists found both amidopyrine and milk sugar in Nurito, but no statement was made regarding the presence of phenolphthalein. In 1927 a representative of the concern declared that amidopyrine had been removed from Nurito and that the "patent medicine" at that time contained aspirin, phenolphthalein, colchicin salicylate, caffeine and milk sugar. *Min-amin*.—It was brought out in an article published by the Bureau of Investigation in *The Journal*, January 26, 1935, that Min-amin was examined in the A. M. A. Chemical Laboratory and found to be essentially powdered wheat germ.—(*J. A. M. A.*, November 30, 1935, p. 1791.)

CLINICAL PATHOLOGIC SEMINAR*

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Tularemia

Case 1.—A man, sixty-three years old, was admitted July 23, 1935, at 8 p. m. He was well until the evening of July 22, when he began to feel sick with no localized complaint. Temperature was 103° and he had a mild chill. On the morning of July 23 he was perspiring profusely; temperature 103°; pulse 100. He felt quite ill but had no localized distress. Findings through physical examination were negative. On the afternoon of the same day his condition was the same.

At this time he said that he had found a woodtick between his toes on July 19 and had removed one from his buttock on July 17. He entered the hospital the evening of July 23. Between the fourth and fifth toes on the right foot was a small dark bluish area about 3 mm. in diameter; not a definite ulcer. On the morning of July 25 a definite enlargement of the femoral glands on the right side was noted; these glands were tender on palpation. At this time the lesion between the toes was seen to be a definite ulcer.

The patient was extremely ill from the time of his admission onward. Temperature was continuously high, ranging from 102° to 106° per rectum. Pulse was around 100 to 110. Heart sounds were good until toward the last week of illness, when they became weaker. He was somewhat delirious throughout the whole course of his illness but at times was rational. He had a chill at the beginning of his illness but no more chills until August 6. There were chills on the 6th, 8th, 9th and 10th of August. There was irregular diarrhea with involuntary stools throughout the illness.

Leukocytes ranged from 6,000 to 12,000 with a preponderance of neutrophils. A skin test for tularemia on July 29 gave negative findings. On July 31, however, the skin test was positive. Agglutination test for tularemia was negative on July 26 and July 30, but positive on August 8. On July 31 scrapings from the ulcer between the toes were immersed in saline solution and injected into a guinea pig. The pig died about forty-eight hours later with the anatomic picture of tularemia and the *Bacillus tularensis* was isolated. The patient was given 15 c.c. of Foshay's serum intravenously on July 29 and July 30; 28 c.c. on August 2 and again on August 3.

Urinalysis on admission showed specific gravity 1.032; albumin +; no sugar; very few casts; on eight subsequent urinalyses the same findings were present; albumin from + to ++. Hemoglobin was 86 per cent on admission; 62 per cent on August 12; erythrocytes 4,500,000 on admission. Blood sugar, July 24, was 147 mg.; urea nitrogen 30 mg. on the same date. Three blood cultures on cystin brain broth medium were all negative. Agglutination tests for typhoid, paratyphoid and undulant fever were negative. Agglutination test for *B. tularensis* on July 30 was positive at 1:320. A guinea pig injected intraperitoneally with 5 c.c. of defibrinated blood from the patient, obtained on August 12, died with the anatomic picture of tularemia. During the last week of life physical signs of extensive pneumonia developed. Death occurred August 13, 1935.

The chief postmortem findings are as follows: There

were about 200 c.c. of slightly cloudy fluid in the right pleural cavity; soft adhesions over the base of the right lung; about 50 c.c. of cloudy fluid in the left pleural cavity. The heart weighed 320 grams and showed cloudy swelling of the muscle. The right lung weighed 1,170 grams. There was a very little air in the middle and lower lobes; air was markedly reduced in the upper lobe, and there was fibrinous exudate over the surfaces of the lung. On section the lung showed small grayish consolidated areas which contained pus in the central portions. There was an abundant bloody fluid in other parts of the lung and the bronchi were filled with thick purulent exudate. There were two distinct nodules, 5 mm. and 8 mm. in diameter, in the lower lobe; on section these contained pus in the central portion. The left lung weighed 875 grams and resembled the right. The spleen weighed 350 grams; on section numerous tubercle-like areas from 1 to 2 mm. in diameter were seen.

The liver weighed 2,000 grams. A few small grayish tubercle-like areas about 1 mm. in diameter were seen on section. The kidneys showed cloudy swelling. The mediastinal lymph nodes and the right inguinal nodes were enlarged and on section showed cheesy necrotic foci throughout. The brain showed no gross disease.

Microscopic Examination.—The tubercle-like areas in the lymph nodes, spleen and liver showed either central necrosis or small central abscesses surrounded with a small amount of epithelioid cell reaction. In the lungs were found some focal necroses and small abscesses, such as are found in the spleen, liver and lymph nodes; there was severe necrotizing bronchitis and bronchiolitis and the bronchi were filled with purulent exudate.

Comment.—This is a typical case of tularemia. The diagnosis was clearly established clinically and the pathologic findings are characteristic of tularemia. It is to be noted that animal inoculation is the most satisfactory method of establishing the diagnosis. The skin test for tularemia is negative at first but becomes positive later. Foshay's serum was ineffective in this case, probably because of its great severity.

Aleukemic Myelosis

Case 2.—A man, sixty-three years old, was admitted January 10, 1936. First admission was in January, 1932. Then he was studied for eighteen days and the resulting diagnosis was pernicious anemia. Hemoglobin was 47 per cent; red cells 1,700,000; white cells 6,500. Morphologic study of the blood showed anisocytosis, macrocytosis, poikilocytosis and polychromasia with occasional nucleated red cells; neutrophils showed "toxic" changes. Liver and spleen were not palpable. There was numbness and tingling of hands and feet, with decreased vibratory sensation in the legs. There was no free gastric HCl. The patient improved markedly on liver therapy and was discharged with hemoglobin of 77 per cent and red count of 2,800,000.

He was re-admitted November 2, 1935. He had continued the liver treatment during the intervening three years. Hemoglobin was 59 per cent; red cells 2,500,000. The blood picture was much the same as

*This is the first of a series of cases to be published each month in MINNESOTA MEDICINE, under the heading "Clinical Pathologic Seminar." The cases presented will be selected by Dr. Bell as the most instructive among those discussed at the weekly pathologic conference held at the University of Minnesota under his direction.

in 1932. The liver now was palpable at 3 cm. above the umbilicus. Possibility that there might be a primary disease of the liver with associated abnormal destruction of red blood cells was considered. Stool urobilinogen showed 613 mg.; urine showed 8 mg. per twenty-four hours. Icterus index was 20; van den Bergh showed a very faint trace in the immediate reaction; ++ in delayed reaction.

On admission in January, 1936, he had noticed a gradual enlargement of the abdomen until two months previously; since then there had been rapid enlargement. Temperature was 99°; pulse 95; respirations 20; blood pressure 140/80. He was well nourished; dyspnea on mild exertion; mucous membranes showed peculiar yellowish tinge; neck and thorax normal; mild edema of legs; icteric tinge of conjunctivæ. The abdomen was very large; suggestion of free abdominal fluid; liver extended into lumbar region on left and below the umbilicus; 3 cm. to the right of the midline the liver was just above the umbilicus; a large mass, 5 cm. in diameter and 1 cm. in thickness, was felt projecting from right lobe.

Urine had a specific gravity of 1.022; trace of albumin; no sugar; two to four pus cells found; bilirubin never found in urine; + to ++++ urobilin and urobilinogen constantly present.

Hemoglobin was 63 per cent; erythrocytes 3,000,000; leukocytes 11,100; polymorphonuclears 66.5 per cent; lymphocytes 18.6 per cent; monocytes 7.3 per cent; eosinophils 7.6 per cent on a 300 cell differential count; 6,000 reticulocytes. Morphologic study showed mild anisocytosis with many cells appearing larger than normal and a few true macrocytes; moderate polychromasia; slight poikilocytosis; occasional nucleated red cells. Leukocytes were toxic; showed slight shift to left; no shift to right; no neutrophils of pernicious anemia found.

Stools showed no occult blood; contained urobilin and urobilinogen in large quantities.

Blood urea nitrogen was 13.4 mg. Icterus index 44; van den Bergh showed ++++ biphasic reaction. Rytz and Kahn tests gave negative findings. X-rays of the gastro-intestinal tract showed nothing of importance; x-ray of heart showed enlargement of left ventricular type; no evidence of pulmonary disease; electrocardiogram showed a normal condition.

The patient complained of tingling and numbness of hands and feet and sore tongue. There was an absence of free HCl in gastric contents. The following diagnoses were considered: pernicious anemia with associated carcinomatous metastasis to liver or nodular cirrhosis with fatty degeneration; metastatic carcinoma of the liver; carcinoma of the liver with associated pernicious anemia. Temperature usually 99.5° or 100°. Four days before death he began to get weaker, restless and worried about his condition. On January 20 icterus index was 54. Stool urobilinogen 218 mg.; urine urobilinogen 15 mg. per twenty-four hours. On January 21 he became quite listless and slept most of the time. On January 22 he was much weaker, became cyanotic and died. Icterus index was 150.

The chief postmortem findings were as follows: Heart was normal. The lungs showed no important change. The liver weighed 4,500 grams. On the external surface a large number of rounded elevations were noted which were bluish to dark red in color and quite soft. On section the parenchyma was found to be studded with circumscribed soft hemorrhagic areas from 1 mm. to 12 cm. in diameter; these seemed to be composed largely of blood which was of reddish to brownish color; when the clots of blood were removed the walls appeared fairly smooth. These areas were so numerous that they destroyed the larger part of the parenchyma. A gross diagnosis of the lesions in the liver was not made. The gallbladder was normal; the bile ducts were patent. The spleen weighed 400 grams; on section it was grayish red and showed no special markings. The other organs, including the

brain, showed nothing of interest. A very intensive examination was made for primary lesions in the organs outside of the liver but none was found.

Microscopic examination of the lesions in the liver showed these to be for the most part hemorrhages, but in the walls of the hemorrhages and in some of the smaller lesions numerous immature leukocytes of the myeloid series were found; also a large number of erythroblasts. The microscopic examination established the diagnosis of aleukemic myelosis of erythroblastic type.

Comment.—This is an example of aleukemic myelosis which showed a hemolytic type of anemia over a period of years. It is to be noted that the anemia responded to liver treatment although the case was not one of true pernicious anemia. The diagnosis could hardly be established clinically. No accurate idea of the disease was obtained until the liver was examined microscopically.

Chronic Steatorrhea

Case 3.—A white man, forty-three years of age, was first admitted December 18, 1934, complaining of diarrhea, weakness, abdominal pain and gaseous distention and attacks of stiffness involving the upper and lower extremities. He had had some form of spasticity when a child. During childhood he had a diarrhea which lasted about eleven months but ended in spontaneous recovery. He had measles and chickenpox in childhood; influenza with pleurisy in 1918.

In the spring of 1933 he began to have attacks of stiffness in the upper extremities; the attacks would last from a few minutes to three or three days. In one severe attack his hands became stiff and three hours later the arms were flexed at the elbows and the fingers were extended at the phalangeal joints and flexed at the metacarpophalangeal joints. He was taken to a hospital, where he remained for several days, during which time he was given parathormone; this relieved the stiffness. During the winter of 1933-1934 he had another similar severe attack. He was taken to a hospital; parathormone was again administered and the stiffness was relieved. Following this discharge he began to lose weight and felt very weak. In August, 1934, he began to have diarrhea; three or four bowel movements daily; the diarrhea was intermittent at first, being more severe after he had eaten coarse foods. About an hour after eating coarse food he would have pain in the upper abdomen followed by abdominal distention. He usually obtained relief by using enemas. There was no nausea or vomiting associated with these attacks. He continued to have mild attacks of stiffness of the hands. During the attacks the hands felt numb and he was more susceptible to cold.

On admission December 18, 1934, he was somewhat emaciated, pale and anemic in appearance. There were no significant findings in the heart or lungs. Blood pressure was 100/70. At this time there was no abdominal distention and there were no palpable masses in the abdomen. Rectal examination was negative. There was positive Chvostek sign and positive Trouseau. Blood: hemoglobin 72 per cent; white cells 5050; polymorphonuclears 68 per cent; lymphocytes 32 per cent. Urine: trace of albumin; acid reaction; no sugar; occasional leukocytes.

X-ray examination of the stomach and duodenum showed the stomach somewhat hypertonic, but no evidence of intrinsic lesion could be determined. The duodenal bulb filled fairly well and appeared normal. Barium enema showed a markedly dilated sigmoid; remainder of colon was fairly normal. Appendix was visualized and appeared normal. The pelvic bones showed no changes. On December 21 blood calcium was 7.94 mg.; blood phosphorus 4.1 mg.; Kline and Kahn negative. The stools were large, foamy and

bright yellow; no mucus; a little blood; no pus; no parasites.

On December 28, blood calcium was 8.4 mg. On January 4, 1935, blood calcium was 11.2 mg.; blood phosphorus 4.5 mg. During the rest of the month of January the calcium remained at about this level. The patient was on a high protein diet throughout his stay in the hospital. On January 31 he was discharged with instructions to continue on this diet and to return to the outpatient clinic in one month for further observation. He was seen from time to time in the outpatient clinic. He gradually lost weight and strength; had attacks of diarrhea, abdominal pain and distention, sometimes with nausea and vomiting.

On February 2, 1936, he was readmitted to the hospital in a moribund condition. He was markedly dehydrated and emaciated; blood pressure was 86/60; extreme asthenia; slight abdominal distention; tenderness in the upper midabdominal region on palpation; marked irritability of muscles; positive Chvostek sign. Blood calcium was 6.71 mg.; blood phosphorus 8 mg. Stools were positive for occult blood. Hemoglobin was 27 per cent; red cells 1,856,000; white cells 6,100; polymorphonuclears 74 per cent; lymphocytes 26 per cent. He was given supportive measures, among them intravenous glucose and saline and intravenous calcium chlorides. Six hours after admission the patient expired.

The chief postmortem findings were as follows: There was marked emaciation; no edema; palpable mass in the left upper quadrant of the abdomen. The peritoneal cavity showed no ascites; no evidence of peritonitis. There was a tumor in the jejunum about 17 feet from the ileocecal valve which caused almost complete obstruction; the bowel above the tumor was markedly dilated, while below it was collapsed. The lungs and heart showed no disease. The spleen weighed 100 grams and showed no disease. The liver weighed 1900 grams and was of a pale yellowish color. The gallbladder showed no disease.

The tumor of the jejunum was found on microscopic examination to be a carcinoid which had infiltrated the walls and caused almost complete obstruction. There were no important changes in any of the other organs.

Diagnoses included chronic steatorrhea; carcinoid tumor of the jejunum with obstruction.

Comment.—This is a typical case of chronic steatorrhea of idiopathic type. The patient was unable to absorb fatty foods; the fats produced a diarrhea. The continuous diarrhea is the cause of emaciation and also of low blood calcium. Low blood calcium is responsible for the spasticity. Death was due to an unsuspected tumor of the jejunum. In chronic steatorrhea there is usually some hyperplasia of the parathyroid glands, but these were not examined in this case. The disease is also called nontropical sprue.

Syphilitic Aortitis

Case 4.—A white man, aged fifty-nine, was admitted February 11, 1936. He was first seen in the dispensary in September, 1935, at which time his chief complaint was of attacks of precordial pain which radiated down the inner side of both arms to the finger tips, was brought on by exertion and accompanied by dyspnea. These attacks had occurred inconstantly over the past five or six years and had been getting progressively more frequent and more severe. Examination revealed a to-and-fro murmur over the aortic area and slight enlargement of the heart to the left. The blood pressure was 160/60. There was a history of one attack of rheumatic fever involving the ankle and knee thirty years ago. A routine blood Wassermann was then

found to be ++++ and the patient was admitted to the hospital.

He admitted having had gonorrhea on two occasions thirteen years ago. He would give no history as to his primary syphilitic infection until on his last admission, at which time he admitted having a chancre twenty or twenty-five years before admission. He said that he had had no secondary manifestations.

Upon admission the pupils reacted to light and accommodation. There were a few râles in the bases of the lungs. The heart showed a diastolic murmur at the apex (in addition to the to-and-fro murmur). Blood pressure was 164/66. Rhythm was regular; pulse rate 80. The reflexes in the lower extremities were absent; there was a questionable Romberg sign.

Blood showed 82 per cent hemoglobin; 6,050 leukocytes; 57 per cent polymorphonuclears, 40 per cent lymphocytes, 1 per cent eosinophils, 2 per cent basophils. Blood Wassermann test was ++++ on two occasions. Urine examination was negative. There was no fever.

Electrocardiogram showed an inverted R wave in lead III and the T wave was flattened in lead III.

X-ray showed the heart to equal 53 per cent with increased prominent left ventricular area. The lungs were normal. There was slight sclerosis of the aorta.

The anginal attacks were treated by nitroglycerin, which gave considerable relief. Antisyphilitic treatment was advised but not begun. The patient was discharged and was followed in the dispensary. His anginal attacks continued to become more frequent. He was admitted on February 11, 1936.

At this time the blood pressure was 152/80 and there were enlarged lymph nodes in the neck. The examination otherwise was exactly similar to that done previously. The white count was 14,500. The patient continued to show congestive râles in the bases of the lungs posteriorly and complained of pain in the calves of the legs. The muscles of the calf were tender to palpation. However, his general condition remained about the same. He died very suddenly at 9:45 p. m., February 16, 1936.

Postmortem examination was made by Dr. John F. Noble. There was no edema; no jaundice; no ascites. There was 100 c.c. of clear fluid in the left pleural cavity; right cavity obliterated by old adhesions. Heart measured 16 cm. transversely; weight 580 grams; there was typical syphilitic aortitis from the aortic ring to the termination of the thoracic aorta, where it dropped off sharply. The leaflets of the aortic valve showed a separation at the commissures and their free margins were thickened and rounded, which produced shortening of the leaflets. The left coronary ostium was about 1 mm. in diameter; the right coronary ostium was completely occluded. There were no scars or areas of softening in the myocardium. There were no mural or valvular thrombi. The left ventricle was hypertrophied and dilated. There was rather marked edema of the lungs and passive congestion of the liver and spleen.

Diagnosis was syphilitic aortitis with narrowing and closure of the coronary ostia and insufficiency of the aortic valve.

Comment.—This case shows two of the classical effects of syphilitic aortitis upon the heart. There is insufficiency of the aortic leaflets from rolling up at their free margins and separation of the leaflets at the commissures. There is also marked reduction of the blood supply of the heart from closure of one coronary ostium and narrowing of the other. The anginal attacks were presumably due largely to the narrowing of the ostia.

CASE REPORTS

SECONDARY PELLAGRA*

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PELLAGRA is easily recognized in its endemic areas, but in the Northern States the disease is unusual and often goes unrecognized. True pellagra in this area is almost always a concomitant finding in individuals suffering from some other disease. By virtue of this primary disease, dietary indiscretions occur which eventually lead to the appearance of the pellagrous lesions, so that pellagra has been found in association with chronic alcoholism, voluntary starvation, as well as in pathological changes in the gastro-intestinal tract. To review the voluminous literature concerning secondary pellagra, would be repetitious and of no great value. The appearance, however, of two pellagrins within a short period of time as a result of self-restricted diets is worthy of reporting.

Case 1.—Mrs. P. C., white female, aged fifty, was admitted to St. John's Hospital on July 9, 1935. At the time of admission she complained of weakness and pain in the upper right quadrant, and skin trouble. She stated that she had been perfectly well until the age of twenty-five, when she first noticed vague and indefinite abdominal pain. This was not severe until she was twenty-seven years of age, when she underwent an exploratory laparotomy. At this time the appendix was removed and the stomach was sutured into a high plane to overcome a gastroptosis. She remained well for three years when the abdominal distress recurred. Upon an ulcer regime the gastric pain disappeared and she enjoyed good health until thirty-eight years of age. At this time she underwent a hemorrhoidectomy and a bilateral herniotomy. At forty years of age her tonsils were removed. At forty-seven years of age she had a recurrence of her epigastric distress, but the pain, this time, was new in character in that it involved the upper right quadrant almost entirely. There was no qualitative or quantitative food relationship. The pain seemed to start in the midline and was always sharp in character with radiation into the right shoulder as well as to the angle of the right scapula. She believed that soda gave occasional relief for this distress. As time went on the frequency of the attacks increased until the past year when on two occasions, acholic stools and jaundice were first noticed by the patient. She consulted a quasi-physician, who told her that she was suffering from achlorhydria. The exhibition of dilute hydrochloric acid did not alter the attacks. Failure to obtain relief forced the patient to self medication. One year before admission to the hospital she placed herself upon a diet consisting entirely of milk and oatmeal. The attacks of epigastric distress decreased in frequency, but she began to lose weight very rapidly. Within a few months she had lost sixty pounds in

weight. Six months ago she developed a very severe eczematous condition of both hands and the dorsum of the forearms. Later the same kind of a lesion appeared on the back of the neck and she noticed that her skin would break out with the same type of a rash when the sunlight struck it. Associated with the skin lesions was a recurring diarrhea. Because of her extremely weakened state, the patient consulted a physician two months before being admitted to the hospital. He placed her upon a well-balanced diet and in addition she was given fruit juices, yeast, viosterol, and dilute hydrochloric acid.

The family history is irrelevant.

Physical examination revealed an extremely emaciated white female who resembled a woman eighty years of age, rather than her stated age of fifty years. The head, eyes, ears, nose and mouth were normal. There were small ulcerative lesions upon the hard palate as well as a few small ulcers on the gum margins. It was quite obvious that these ulcers were healing. Examination of the neck and chest was negative. Examination of the heart was negative. Blood pressure was 128 over 80; pulse 72. On examination of the abdomen there was pain and tenderness over the gallbladder region, and through the very thin abdominal wall the gallbladder was palpable and seemed to be the size of a large pear. Across the lower portion of the abdomen were two herniotomy scars, and in the upper abdomen was the scar of a left rectus incision. Examination of the genital organs and rectum was negative. Hernial rings were negative. Back negative. Examination of the joints, reflexes and extremities showed them to be negative. Proctoscopy was negative. On the back of the neck was a scaling eczematous lesion the size of a dollar. Upon the dorsum of the hands, extending up the dorsum of the forearms to the elbows, was a fading eczematous rash. The skin condition of one arm and hand was a mirror image of the other. The rash was perfectly symmetrical. Pigmentation was still present and in some areas an erythematous blush was still present in the lesions.

Laboratory examination: Urine normal, hemoglobin 65 per cent, red blood cells 3,600,000, white blood cells, 6,500. Basal metabolism, plus five. Wassermann negative. Icteric index 13. Gastric analysis: free hydrochloric acid, 96; combined, 4.

X-ray examination: Chest and gastro-intestinal tract normal. Gallbladder non-functioning and filled with stones. Sella turcica normal.

The electrocardiogram was normal.

Diagnosis: (1) Cholecystitis and cholelithiasis; (2) pellagra associated with emaciation; (3) voluntary starvation; (4) secondary anemia.

Following discharge from the hospital, the patient was referred home for treatment. She was placed on a normal diet. In addition, a high vitamin regime was instituted. Lextron was administered along with extralin. No free hydrochloric acid was given because of the laboratory results. In one month, the skin condition had entirely disappeared, the stomatitis was cured, and the patient had regained ten pounds of her weight. The gallbladder was removed by Dr. Plondke, and the patient made an uneventful convalescence. She is still gaining weight, and to date there has been a steady improvement in her general condition.

Summary: This patient, by voluntary restriction of her diet to relieve gallbladder pain, developed the syndrome of bilateral symmetrical dermatitis, diarrhea,

*From the Medical Service of St. John's Hospital.

and a mild stomatitis. The institution of anti-pellagra treatment brought about a marked improvement and cure in the patient.

Case 2.—Mrs. L. S., aged 49, was first seen at my office in February, 1934. At this time she complained of indigestion, numbness and tingling of her hands and feet, periodic diarrhea and brittle finger nails. She had enjoyed perfect health for years and only during the past six months had she noticed anything wrong with her physical well being. Six months previous she noticed that she was having occasional attacks of watery stools and this condition had remained until the present time. Further, there were vague gastric pains of no definite radiation or food relationship. At this time she noticed marked weakness and palpitation on exertion. In the past two months slight manual labor would invariably result in cracked finger nails. Past history and family history are irrelevant.

Physical examination revealed a well developed, well nourished white female with a definite anemic appearance. Examination of the hernial rings revealed a right inguinal hernia. The finger nails were pale in appearance, definitely of the watch crystal type. Leukonychia was present and the nails were soft and marked with fissures. Otherwise, physical examination gave negative findings.

Laboratory examination: Urine negative. Gastric analysis showed the absence of free hydrochloric acid. Blood: hemoglobin, 48 per cent; red blood cells 3,900,000, white blood cells 7,400. Color index .6.

X-ray examination of the gallbladder and gastrointestinal tract was normal.

Diagnosis: Achlorhydric hypochromic anemia; right inguinal hernia.

She was placed upon a normal diet and 90 minims of hydrochloric acid were administered daily. In addition she was given lextron and iron ammonium citrate. Under this treatment the patient's condition improved rapidly with the result that four weeks later she refused to take treatment any longer. Three months later the original symptoms had returned, when she voluntarily placed herself upon her original medications, but stopped taking them when a friend advised her that the hydrochloric acid would eat out her stomach. The patient then placed herself on the diet of custard, jello and milk, and only upon rare occasions would she eat a normal meal. As time went on she began to lose weight and became extremely weak. On June 29, 1935, the patient again consulted me because of severe pain in the lower right quadrant, associated with constipation. Physical examination at this time revealed a striking condition. Her gums were swollen and edematous and the mouth was studded with ulcerative lesions. The palms of the hands were covered with an acute weeping bilateral symmetrical eczema. These lesions extended the length of the forearm to the elbow. The same lesions were present over the tibia and feet. In addition, the patient had an incarcerated right inguinal hernia. Blood examination at this time revealed her hemoglobin to be 42 per cent, red blood cells 3.2, and white blood cells 7,200. A diagnosis was made of pellagra, incarcerated inguinal hernia, simple hypochromic anemia. At two o'clock of that day, the patient was operated upon by Dr. Plondke for the relief of the incarcerated hernia. She was then placed upon dilute hydrochloric acid and a normal diet. Lextron and extralin were administered orally and in addition she received two cubic centimeters of liver extract, intramuscularly. Hydrogen peroxide mouth washes were used to relieve the oral pain. The patient's response was dramatic. The skin lesions healed spontaneously and the skin was perfectly normal at the end of four weeks. Three months after discharge she was markedly improved. Her hemoglobin was 78 per cent, red blood count 4,500,000 and white blood count, 6,900.

Summary: A patient with achlorhydria placed herself on a limited diet. As a result of this diet she

developed a diarrhea and bilateral symmetrical eczema of the arms and legs. These lesions responded to an anti-pellagra regime.

Two cases of dietary pellagra are reported wherein by voluntary restriction of diet, pellagra developed and was completely relieved by anti-pellagra management.

ENORMOUS DILATATION OF LEFT AURICLE*

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V. F., a white woman, thirty-eight years of age, entered the Minneapolis General Hospital because of acute cardiac failure of two weeks duration.

At the age of eighteen she had her first attack of rheumatic fever, which confined her to bed for six months. In the spring of the following year a second attack of acute swollen joints occurred, lasting seven months. She was able to carry on until she was twenty-four years of age, when dyspnea became severe and persisted for the following nine years.

At the age of thirty-three, after a severe upper respiratory infection, cardiac symptoms increased (weakness, dyspnea, precordial pain and edema of the legs), and she was admitted to the University of Wisconsin General Hospital, Madison, Wisconsin.

Physical examination at that time showed "pulsation of neck vessels, rapid respiratory rate, prominent heaving precordium, systolic retraction in sixth and seventh interspaces in the mid-axillary line, precordial pulsation in the third and fourth interspaces, palpable apical presystolic thrill, total cardiac arrhythmia, apical presystolic and systolic murmurs, accentuated pulmonic second sound, positive Broadbent's sign, limitation of expansion at the left base with râles throughout both bases, palpable liver, slight pretibial edema, hyperreflexia and blood pressure of 138/68.

"Laboratory findings included a urine containing an inconstant trace of albumin, a few leukocytes and an occasional hyalin cast. The blood count showed a hemoglobin of 66 per cent and red count numbering 4,820,000 on admission. The blood Wassermann was negative and the blood chemistry showed normal variations. Basal metabolism varied between plus 6.4 and plus 0.3, on four determinations. X-ray for heart size showed marked distortion and enlargement of the heart shadow, irregularity on the right side above as if from superimposed mediastinal or lung shadow; on the left the heart shadow extended to the lateral chest wall. Electrocardiographic studies showed auricular fibrillation and slight right ventricular preponderance. T₂ and T₃ were inverted.

"A diagnosis of rheumatic endocarditis, mitral stenosis and regurgitation, adhesive pericarditis, myocardial degeneration with mild decompensation, auricular fibrillation and secondary anemia was made."[†]

At the end of five months in the hospital, decompensation was still present, but she left on her own insistence. She had been on some form of digitalis medication for ten years at this time.

*From the Pathological Laboratories of the Minneapolis General Hospital and Department of Pathology, University of Minnesota Medical School, Dr. Lufkin, chief.

[†]Personal communication—Dr. W. S. Middleton. The University of Wisconsin General Hospital.

While in the Minneapolis General Hospital, the patient was unable to lie down because of respiratory difficulty. The anterior thorax showed a heaving impulse in the region of the sixth rib in the left midaxillary line. A marked Broadbent's sign was present. There were both systolic and diastolic thrills over the entire

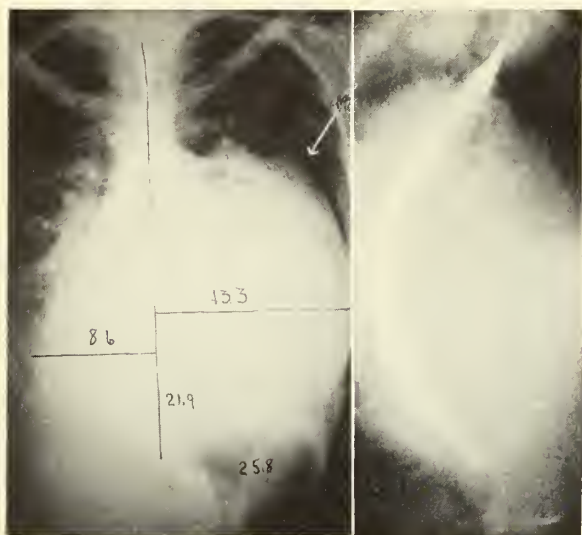


Fig. 1 (left). Barium in the displaced (R) esophagus does not show well.

Fig. 2 (right). Lateral view with opaque substance in the esophagus.

precordium. Percussion of the heart borders showed them to be moderately enlarged in all directions (2 cm.). At the base of the heart the tones were normal except that the pulmonic second was louder than the aortic second sound. No murmurs were heard in these areas. A very sharp first sound was heard at the apex as well as a systolic and a diastolic murmur. The pulse rate was ninety and the rhythm was that of an absolute irregularity. The systolic pressure averaged 110.

The urine contained traces of albumin, occasional hyaline and granular casts, erythrocytes and pus cells. The urine specific gravity varied from 1002 to 1017. The hemoglobin was 90 per cent. The red blood count was 4,170,000 and the white count 11,000 with 84 per cent polymorphonuclears. The Wassermann and Kahn tests were negative. Thirty-six per cent of phenolphthalein was excreted in two hours.

The electrocardiographic report showed diphasic T₁ and T₃, as well as an isoelectric T₁, suggesting myocardial damage. This combined with evidence of right ventricular preponderance pointed to mitral disease.

The x-ray showed as follows: TT — 25.8; ML — 13.3; MR — 8.6; Total 21.7; Arch — 2.8. There were very marked increases of the cardiac shadow both to the left and to the right. The left border reached the lateral chest wall and its upper portion assumed a convexity which under the fluoroscope appeared to pulsate. The soft tissue outline was thought to be the left auricle which was demonstrated to the right of the spine (Fig. 1). There was moderate increase of the broncho-vascular tree, suggesting congestion. The esophagus showed diffuse posterior displacement as well as displacement to the right, indicating marked enlargement of the left auricle (Fig. 2).

Cardiac distress became progressively more severe and the patient died on the thirty-fifth day of hospital stay.

Autopsy Findings

The body was that of a poorly nourished individual 166 cm. in length and weighing 100 pounds. There was edema (plus 3) of the lower extremities and dependent portions of the body. There was cyanosis (plus 3) of the fingernail beds and lips.

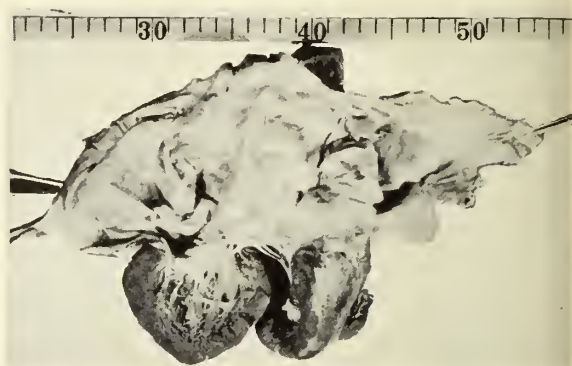


Fig. 3. Photograph showing the left auricle opened. Rule in centimeters.

The peritoneal cavity contained 1,000 c.c. of clear fluid. The dome of the diaphragm on the right was at the level of the sixth rib and on the left at the seventh. The liver edge was 4 cm. below the costal margin in the midclavicular line.

Both pleural cavities were obliterated by firm fibrous adhesions.

The transverse diameter of the thorax was 27 cm. while the transverse diameter of the heart was 21 cm. There were many old firm fibrous adhesions scattered throughout the pericardial sac, no more on the left than on the right. The heart displaced the lungs so that only the tips of the upper lobes were visible. The left auricle was found to be responsible for most of the enlargement as it occupied nearly one-half of the left chest, and also formed the right cardiac border. The mitral valve admitted the tip of the scissors (2 cm. in diameter). The leaflets were fibrous, thickened and immobile. The left auricle above the valve was tremendously dilated, being larger in size than the rest of the heart and having the capacity of 1,200 c.c. of fluid (Fig. 3). The left auricular wall was thin (3 mm.) and fibrous. It was firmly attached to the pericardium by adhesions.

The right ventricular wall was twice the thickness of the left. The aortic valve was 7 cm. in circumference, and other valves showed no change. The pulmonary arteries were not thickened. There was no ectasia of the root of the aorta and the coronaries were not sclerosed.

The total weight of the heart (with auricle) was only 450 gm.

The right lung weighed 560 gm. and the left 320. The lower lobes of both lungs were greatly compressed by the enlarged heart and crepitation was somewhat diminished. The color was dark purple on section and much fluid could be expressed. The upper lobes showed a diffuse brownish discoloration. Microscopic study of these areas showed chronic passive congestion to a marked degree.

The spleen weighed 90 gm. There was some compression of the upper pole. The liver also showed a deep depression on the superior surface of the left lobe as a result of the cardiac hypertrophy and dilatation. The section of the liver was that of cyanotic induration.

The kidneys showed only chronic passive congestion weights: R — 125; L — 120).

The other organs showed no abnormalities.

Comment

La Forque³ in 1899 first described marked enlargement of the left auricle in a patient with hereditary aortic and adherent pericarditis. Owen and Fenton⁵ in 1901 described marked enlargement of the same appendage.

Steel⁷ and Burkhart² recently reviewed the literature with reference to the subject of left auricular dilatation. In Steel's fifteen cases the enlargement was commonly associated with mitral valvular disease (stenosis more commonly than regurgitation) of rheumatic etiology. An adherent pericardium was present in nearly all of the cases.

X-ray examination helps in diagnosis. Schott⁶ followed progressive enlargement of the auricle with the orthodiagram. It is said that in 5 per cent of the mitrostenotic lesions the left auricle dilates to the right of the right auricle. Occasionally an individual with this type of heart disease may carry on for a long time. In one case described, the auricle contained 3 liters,⁴ another 1,700 cubic centimeters,¹ and in our case 1,200 cubic centimeters.

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PEANUT KERNEL IN THE BRONCHUS OF AN ADULT*

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PEANUT kernels and shells are frequently encountered as foreign bodies in the air passages of children less than six years of age, but they are rarely encountered in older children and practically never in adults.

Many articles have been published in reference to the dangers of the peanut as a foreign body in the bronchi of children, but adults have not been warned sufficiently about the possible hazards associated with the aspiration of such foreign bodies. Vegetable foreign bodies of any type, but especially the peanut, may give rise to intense and serious reactions in the tracheo-bronchial tree of children, and in the case herewith reported, in which an adult was affected, this reaction was quite as severe.

The patient, a man forty-two years of age, came for examination December 19, 1935. On December 7, he had choked while eating salted peanuts and had had a coughing spell lasting about ten minutes. This cough had continued, without any other definite paroxysms, and the sputum had become purulent and blood-stained.

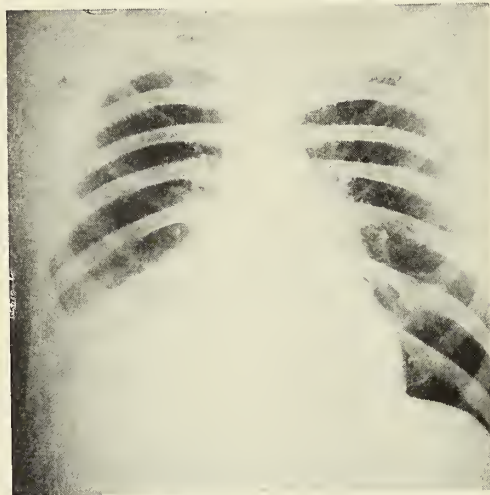


Fig. 1. Infiltration base of right lung.

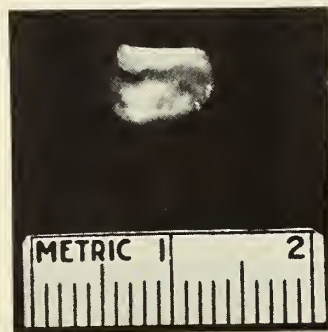


Fig. 2. Foreign body, portion of peanut kernel.

The day after the initial difficulty the patient had felt feverish and had noted some pain and wheezing on the right side of the thorax. After feeling ill for a week he had consulted his physician, who had found that he had a temperature of 104° F. Evidence of infiltration had been detected in the right lung and the patient was advised to come to the clinic for bronchoscopic examination.

At the time of examination, the patient was pale and coughed frequently. His temperature was 99.6° F. The percussion note was dull over the base of the right lung, posteriorly, and the breath sounds were distant over this area. Roentgenoscopic examination revealed diffuse infiltration over the lower lobe of the right lung that suggested the presence of bronchopneumonia (Fig. 1). Leukocytes numbered 16,000 per cubic millimeter of blood.

Bronchoscopic examination was made without delay and a portion of peanut kernel was removed from the bronchus to the lower lobe of the right lung (Fig. 2). The bronchial wall was slightly ulcerated at the point of lodgment of this foreign body.

Four days later the patient seemed quite well and was permitted to return home.

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota.

EDITORIAL

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J. R. BRUCE, Saint Paul

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Druggists and Doctors

COÖPERATION between the druggists and doctors is essential to the best interests of the public. Too often, there is a disregard, on the part of the one, of the functions and interests of the other. Interprofessional Relationship committees of state and county pharmaceutical and medical organizations have been in existence for several years, and, although not very active so far, they afford a medium for ironing out causes of friction and for coöperating for the best interests of the public.

The Interprofessional Relationship committees of the State Pharmaceutical and State Medical Associations had a meeting last month and discussed some rather interesting matters of common interest to the two professions. Both sides had some minor grievance to air, but the main object of the meeting was to get each other's viewpoint and find common ground for coöperation.

The modern drug store is almost everything but what its name implies. While every store must have a registered pharmacist, he, in most instances, must be a jack of all trades to make a living. Only in the larger centers can he limit himself to dispensing. The well-to-do druggist, let alone pharmacist, is a *rara avis*. There has been some agitation about distinguishing between the dispensing pharmacist and the ordinary druggist. Certainly a pharmacist's training is not all-sufficient to make him a successful present-day proprietor of a so-called drug store. On the other hand, we question whether in the present-day set-up many pharmacies limited to dispensing can prosper, although such a change would add dignity to pharmacy and should be welcomed.

The druggist has some criticism to place at the door of the medical profession. Some doctors, especially those in the country, do their own dispensing. While this makes it more difficult for the country pharmacist, the doctor justifies such action in the claimed saving to the patient and increase in his own income. Some instances of nice coöperation could be cited whereby the doctor is saved the trouble of maintaining a drug line and the druggist does not overcharge because he is filling a prescription. The initials "P.P." on a prescription do not stand for Latin words, but signify "poor patient" and most druggists will act on the suggestion. Coöperation in the prescribing of the multitudinous new remedies suggested by the detail men should help to limit on the shelves of the druggists the number of partly used bottles which constitute a loss to him.

Both doctors and druggists are responsible in part for the enormous amount of self medication in evidence today. The undignified practice of handing a prescription blank or often a mere slip of paper to a patient with the name of a preparation on it and no directions means that the druggist must sell a stock bottle to the patient with the original label on it and the name of the preparation will be handed about to friends for them to try. The need of a remedy merits the dignity of a prescription. Or, a phy-

ician may thoughtlessly hand out a sample with the original label not removed—a practice similarly favoring self medication. And some members of our profession have even been reported to have sold their free samples to patients. With the flood of samples, for the most part of little use, which reach the doctor's office, such an unprofessional procedure on any appreciable scale would, by easily underselling the corner drug store, materially interfere with its sales. The druggist, on the other hand, is daily put in the embarrassing position of being quizzed about remedies for this and that. He is not entitled to prescribe, and, without being arbitrary about it, the medical profession is entitled to expect the druggist to decline to prescribe, although his reference of a customer to a doctor may appear like a conspiracy on the part of the druggist and the doctor. Much harm may be done an individual who is assisted by a druggist in self medication.

Perhaps one of the most outstanding instances of harmful self medication is the unrestricted dispensing of barbiturates and similar preparations. There is a growing sentiment among pharmacists and doctors that the sale of these drugs should be limited by law to sale on prescription. Although this would undoubtedly mean fewer sales for druggists, thoughtful members of the profession are convinced of the desirability of taking this step already taken in the British Isles. Here is an instance where, if the executive bodies of both professions should determine its advisability, the two professions could coöperate in obtaining appropriate legislation.

In addition to the possible harm from self medication, the uselessness and enormous waste of money involved is reason for active coöperation between druggists and doctors. A beginning has been made in the circularization of the medical profession by the combined Interprofessional Relationship committees with printed cards showing the much lower costs of the official compounds compared to imitation proprietaries. The committees are further circularizing the profession of the state with useful prescriptions. Laziness and poor undergraduate training in prescription writing and pharmacology in general result in the doctor's unwittingly aiding the proprietary racket.

Our Caribbean Neighbors

ON a Caribbean cruise one absorbs besides sunshine and fresh air certain impressions of the various countries and peoples not so far from our very doors.

Our acquisition of Porto Rico in 1898 presented a problem which we have only begun to solve, with the establishment of public schools, the construction of good roads, and the passing of certain hygienic regulations such as enforced protection of the feet to prevent hook worm infection. The poverty of the natives is only too striking. The needs in this tropical island are few, work is for the most part seasonal and poorly paid, and earnings easily frittered away in shooting craps and in cock fighting. The natives live on a dish of rice, beans and perhaps a little chicken, even the native fruits being sold in the markets, and meat prices are prohibitive. Undernourishment prevails. Baseball and the ice cream soda have interestingly accompanied beginning Americanization.

Venezuela presents the opposite extreme. This country's oil resources, which have been developed only in the past two decades by foreign oil companies, have furnished so much revenue that Venezuela holds the unique position of a country without a national debt (U. S. please notice). And this in spite of the unbelievable graft perpetrated by Gomez, who held his dictatorship from 1908 until his death last December at the age of seventy-eight. He collected a personal contribution from the foreign oil companies for every barrel of oil exported. It is common knowledge that Gomez was the proud father of some eighty offspring, although never having found it expedient to bind himself with matrimonial bonds. It is said that when Gomez died of a Sunday in December last the news of his demise was withheld from his people until the following Thursday to enable his various heirs to remove his fortune, estimated at some \$700,000,000 in gold, and themselves to the nearby island of Curacao. Naturally the name of Gomez is anathema to Venezuelans in spite of the marvelous development of the country during his dictatorship. This is in extreme contrast to that of Bolivar, the George Washington of South America, whose memory is fittingly recorded in the capitol at Caracas. This remarkable general was not content to free one country from Spanish rule, but before his death at the

age of forty-seven he liberated four other South American countries also: Colombia, Ecuador, Peru and Bolivia. Caracas, the capitol of Venezuela, was located for protection against buccaneers five miles back and 3,000 feet above its seaport, La Guaira, and is reached over a marvelous mountain road winding back and forth over a range of the Andes.

Abounding with beautiful and pretentious villas, Caracas possesses a country club that would put any Twin City club house in the shade, although not so much can be said for the burnt up fairways of its golf course. The cattle ranches of the inland plains of Venezuela provide beef at ten cents a pound, as the nutrition of the natives testifies.

Not far west of La Guaira lies the small Dutch island of Curacao with its capitol Willemstad, which might be a replica of a town in Holland. Its tinted houses with tiled roofs and its cleanliness testify to its Dutch character. The market consists of rows of sailing craft lined up along its natural harbor and loaded with food stuff from Venezuela, most of its food having to be imported. Its major industry is the refinement of crude oil shipped from Venezuela in small barges.

Colombia seems less prosperous. In spite of pretentious dwellings in Cartagena, the streets are poorly paved, if at all, and beggars abound. The dungeons under the old city wall where prisoners were left to die at the time of the Spanish Inquisition, and El Popo monastery on an eminence overlooking the city, where the nuns threw themselves over a sheer cliff rather than fall into the hands of that most ruthless of buccaneers, the Englishman Henry Morgan, serve to recall tragic days in the history of this part of the world.

The Panama Canal, sometimes called the eighth wonder of the world, is a tribute to man's perseverance and sanitation. Instead of a region infested with yellow fever and malaria, the control of the breeding places of the *Stegomyia* and *Anopheles* mosquitoes has made the Canal Zone one of the most healthful regions in the world. One is impressed with the size of the cities at both ends of the canal and the polyglot population. The shopkeepers of various nationalities offer goods from all over the world at enticing prices to the thousands who visit the cities each year.

The countries bordering the Caribbean Sea have lived through a stormy past, having been repeatedly conquered by various European nations and having been for a period at the mercy of the buccaneers. Recent years have been more kind and certain of the nations have made great strides, while others have far to go to overcome a natural slovenliness in living, which seems to be indigent to tropical climates.

C. B. D.

Dr. E. T. Bell's Seminar

PATHOLOGIC conferences are among the most important medical meetings held. The conference held at the University Medical School each week by the Department of Pathology under the direction of Dr. E. T. Bell is particularly instructive. Dr. Bell has consented to report a few of the most instructive cases presented at the pathologic seminar each month in MINNESOTA MEDICINE, beginning with this issue. Each case will be presented as a diagnostic problem, "die Erklarung" to follow. We feel sure that our readers will welcome this additional feature in the journal.

Early Diagnosis Campaign

Describing tuberculosis as "the robber of the prime of life," the nation-wide educational campaign of the National Tuberculosis Association and its branches will be conducted throughout the month of April.

Focusing the attention of the public on the importance of locating tuberculosis in its early stage, before there are any symptoms, the campaign will emphasize the fact that tuberculosis takes the majority of its victims from lives of active usefulness. Literature now being distributed by the Hennepin County Tuberculosis Association states that:

Tuberculosis takes 75,000 lives in the United States every year.

The majority of its victims are between 15 and 45 years of age. In this age group are students, parents of young children, wage earners, business leaders and professional people.

There are half a million people actively ill with tuberculosis right now in the United States.

To reduce the death toll of tuberculosis, the tuberculosis associations will unite in urging regular medical examinations, including the tuberculin skin test and, if necessary, the x-ray. "If all cases of tuberculosis were found as early as they can be detected through the use of the tuberculin skin test and the x-ray, and properly treated, tuberculosis would no longer be so great a danger to us all," a campaign message reads.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.
L. H. Rutledge, M. D.

W. F. Braasch, M. D., Chairman

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President's Message

Each month, each week, brings a new challenge to the already overworked physician.

The recent County Officers' Meeting brought us face to face with two problems, especially, that require more of us than pious words and promises.

One of these problems is the necessity for establishing medical care for the indigent on the basis of free choice of physician in every county in Minnesota.

The other involves the necessity for fighting any general centralization of public health and medical services under a state board of social agencies. There are others.

Thus it is that medical men have work to do. Besides taking care of their practices, keeping up with scientific progress, they must be sociologists, economic experts, political strategists.

There is no use to argue that they are busy; they have no time. There is no choice for the medical man; he must make time.

Otherwise he will be superseded at the council table by the willing welfare workers and the willing politicians who have plenty of time.

Perhaps there are people who can afford to drift with the modern current, not caring to what strange shore it washes them. But not the doctors. Public welfare, scientific progress, medical freedom are at stake and the doctor must fight for them.

W. W. WILL,
President, Minnesota
State Medical Association.

County Officers' Meeting

More than sixty secretaries, officers, council members sat down to breakfast together for the round table conference that opened the 1936 County Officers' Meeting at the Hotel Lowry in Saint Paul, February 29.

They were joined by many others as the day-long conference went on and the whole ended with a general discussion of what is obviously the most critical immediate problem of organized medicine in Minnesota: the re-adjustment and

improvement of Minnesota county plans for medical care of the sick poor.

New Plan

A novelty in seating arrangements marked the morning conference. Each councilor district had a table to itself so that neighbors from the district might talk over matters of local interest with each other and with their councilors. The new plan worked admirably.

A crowded and important general program halted these district discussions.

Representatives from nearly all of the government bureaus and agencies that, in these changing times, play an ever more important part in the medical care of the sick and in public health, were there.

They talked and they answered questions. The following résumé recounts very briefly what they said and also what medical leaders told the attending members:

Mr. Henry W. Goetzinger Industrial Commission of Minnesota

In general, the responsibility for provision of medical care for the injured worker under Workmen's Compensation Law in Minnesota lies with the employer. The employers, then, with the advice of the Industrial Commission, must see that the patient is cared for by qualified physicians; that he is protected against quacks and cultists even of his own choosing.

The Industrial Commission readily coöperates in securing change of physician if it seems justified and in approving the bills of the physicians of the patient's choosing providing, for some reason, the employer has refused or has been unable to provide a qualified physician.

The classification of physicians as "M.D.," "Osteopath," et cetera, has been added to new report blanks so that the commission can identify competent medical opinion.

Penalties

Business establishments employing more than one person can be fined in case of injury to an employee, if these establishments are not financially responsible and have not taken out insurance. The penalty is five times the cost of insurance, but no imprisonment is provided.

Unfortunately, the attorney general's office has been unwilling to press prosecution in this matter even in the case of flagrant violations of the statute.

An amendment to the compensation law was passed at the last session of the Legislature which gives the physician a simple method for securing judgments on awards for medical services. He has only to show the court that his bill has been allowed by the Industrial Commission.

Mr. H. S. Gossage Chief of the Narcotic Division

Addicts use numerous ruses to obtain narcotics. The most frequent are spasms of coughing, renal colic, cramps, internal female troubles. Some of them even resort to use of pins or toothpicks so as to cough or pass blood.

No physician should rely upon symptoms alone or upon the word of a patient in prescribing a narcotic. A thorough examination is necessary in every case, especially of new or itinerant patients.

The physician cannot relieve himself of responsibility by placing any blame upon the patient.

Doctor's Job

The Narcotic Division, on its side, has no power to prescribe narcotics itself or to authorize such prescriptions on the part of the physician. That is the job of the doctor alone.

As a registrant under the Harrison Narcotic Law, the doctor is required to keep his tax stamp in display in his office. To fail in that is a violation of the law.

Except as specifically provided in emergencies, it is also a violation of the law to telephone prescriptions for narcotics. In case of emergency the druggist may deliver narcotics pursuant to a telephone order, if the druggist or his agent is provided with a properly prepared prescription at the time the delivery is made.

Mr. Fred G. Garling State Liquor Commission

In certain dry territories of the state there are still abuses of the liquor prescription privilege. In one dry town of 4,000 persons the drug store was found to be making sales of approximately 3,000 pints each month. There are at least fifty-nine drug stores like that one in the state. We hesitate to take any move against them as we seem unable to mete out any punishment under our present state law.

Only a minority of physicians offend in this regard but the profession in general should make it clearly understood that it is emphatically opposed to this abuse of medical privilege.

Mr. Kenneth E. Setre U. S. Public Health Service National Health Inventory

The so-called National Health Inventory is nearing completion in Minneapolis, Saint Paul, Winona, Brainerd and Chisholm. Physicians in these localities will shortly receive blanks asking for confirmation of diagnoses reported by patients at the door. These blanks will be sent only with the consent of the patient. They will be sent direct to the physician from the office of the Surgeon General in Washington and they are to be returned to Washington. The physician who thus confirms or corrects the diagnosis secured at the door by the enumerator is not violating the law, so the Attorney General says. He will receive twenty-five cents for each blank that he fills out and sends on to Washington and, for convenience sake, the blanks will be sent to him in groups instead of singly.

Other Studies

The Chronic Disease Survey is being followed by a survey of all hospital and health facilities in the cities selected. Also a survey of occupational disease and mortality in Minneapolis, Saint Paul and International Falls, and an examination by audiometer of all who are reported deaf in the chronic disease survey to determine the amount of deafness.

In connection with the last named investigation, an additional group will be selected for hearing measurements from among those who have not been reported as deaf in any degree. The object is not only to secure valuable data about degrees of deafness related to age, dis-

ease, et cetera, but to enable statisticians who use all these figures to estimate the accuracy and value of the items reported on the schedules for the country as a whole.

(As noted in these columns, the uses to which these statistics are to be put are presumably scientific and there is no doubt that many of them will prove valuable. They will be available, also, to that eager body of reformers who yearn to re-organize medicine in the United States. That these reformers await the results with impatience and that they will be able to twist the figures to suit almost any preconceived notion also goes without saying.)

M. M. Hirsch **County Commissioner, Itasca County**

The doctor's point of view on the problem of medical care for the indigent was presented for the first time to the Minnesota Association of County Commissioners at its meeting in Minneapolis, February 28.

Dr. O. E. Locken of Crookston put the case, and the commissioners listened. Their Resolutions Committee had accepted, without objection, a resolution approving the fee basis plan which guarantees to the indigent patient a free choice of physician. It was voted down (Dr. Hirsch alone dissenting) on the floor.

"Unnecessary Calls"

No reasons were given for the defeat, but among personal observations overheard among the commissioners, this one appeared frequently: "When doctors are paid on the fee basis, they frequently make unnecessary calls."

(It was agreed by others who attended the meeting, including E. A. Meyerding, secretary, and L. L. Sogge, chairman of the Committee on Public Policy and Legislation, that Dr. Locken's talk was well received, though unfortunately it had to be scheduled after—not before—presentation of resolutions. The Locken talk gave the commissioners something to think about and assuredly they will be more approachable next year.)

E. A. Meyerding **Secretary**

Promotion of the Red Cross First Aid program serves to call attention to what might be a dangerous procedure on the part of Red Cross officials and of some county medical societies, too.

When the American Medical Association approved the Red Cross program it was with the

stipulation that state medical societies, in each case, should be consulted and their approval secured.

The Red Cross, without any malicious intent whatever, went direct to county medical societies for approval and assistance. Organized on regional rather than on state lines, the Red Cross is not in the habit of dealing with state organizations. Many county societies listened, also, and gave a more or less doubtful approval without consulting the state society.

No Harm Done

In this case, no harm is done. The program as a whole is without offence, though there may be difficulties here and there when it comes to working out such details as the order of doctors' names to be posted at the filling station first aid headquarters.

County societies are especially urged, however, to refer all such matters to the state office as a matter of routine for information and advice. Other general programs will be proposed by outside organizations and they may not be so innocuous as the First Aid program of the Red Cross.

(The Council, upon being tardily asked for its approval of the program, passed a resolution on the subject later in the day which is printed elsewhere in this issue.)

George Earl **Councilor, Fifth District**

There is a shortage of nurses in city and rural hospitals today. This grave state of affairs is undoubtedly related to the demands of nursing associations for higher education standards and requirements for nurses.

When more and more nurses are educated to become teachers and executives, fewer are available for essential bedside care.

Also, advancing standards of education mean advancing costs, and a serious shortage of good nurses available at a price the public can pay.

What are we doctors going to do about it?

The time has come when we must consider the matter seriously. We have no quarrel with education as such. A nursing corps that is graduated from highly professional training schools followed by a hospital internship is a good goal to aim at a hundred years from now.

But what are we going to do for bedside nurses to staff our hospitals now?

Opposition Group

It would seem that nursing progress has already over-reached the public purse. An opposition group is developing that declares standards have advanced too far; that ward nurses and attendants must be trained at a much smaller expense in time and money to take care of patients, particularly for the smaller hospitals.

Such a solution is not pleasing to the professional associations of nurses. But these associations must take account of this tendency and make adjustments accordingly.

(Discussion brought out complaints of nursing shortage in many parts of the state. A commissioner of the Department of Education will study the matter. Representatives of the Minnesota State Medical Association have been asked to confer with nursing associations on the subject.)

H. Z. Giffin, Rochester Councilor, First District

The following resolution was passed at a meeting of mayors and relief workers of Minnesota called by L. P. Zimmerman, relief administrator.

1. RESOLVED: That the Executive Council be urged to announce its policy and program of allocation of state funds to aid local governments in formulating their programs in financing direct relief. We strongly recommend that the funds be allocated to meet commitments incurred in 1936.

2. RESOLVED: That this committee feels it essential that the Federal Government give further direct relief grants to states; that direct relief again be established regardless of plans for any work program or security measures; it is the opinion of this meeting that if the Federal Government does not so act, the direct relief needs of Minnesota cannot be met.

3. RESOLVED: *That this committee believes the various types of public welfare now administered by several state agencies be coördinated with a modern state welfare department; that local units of government administering welfare be similarly coördinated into local welfare departments to fix responsibility and to secure efficiency, economy and improved service and that the state and local welfare services be articulated; that it hopes the Interim Committee of the Legislature will study the situation thoroughly; that this committee and these cities and counties pledge any advisory assistance to the Interim Committee which we are able to give.*

4. RESOLVED: That the Federal Government continue a system of federal aid and rehabilitation to the Indians of Minnesota and that the Government appropriate the necessary funds for doing so; and that this

action is urged in order to conserve state and local funds available in the state.

5. RESOLVED: That the Federal Government be asked to continue its aid to interstate transients because local governments are unable to carry the cost burden under existing financial and legal limitations.

The danger in this proposal lies in the fact that a powerful executive board can be set up under it—and that this board, which would so largely control public health work and medical care in the state, would be made up chiefly of social workers.

This is a matter that requires careful watching. We must act when the time comes to protect the practice of medicine from any such lay bureaucratic control in Minnesota.

The problem of medical care for the indigent in the state also presents itself with a renewed urgency just now.

With the return to the counties of complete responsibility for relief, the need for new and better arrangements for medical care of the sick poor becomes acute. Our Committees of Three should be in constant touch with their county commissioners and the welfare board now being formed under the county commissioner control for management of relief.

Time lost now in getting a good start under the new organization cannot be made up.

Weakening the Seal

I want to mention another matter that touches medical men in Minnesota. That is the proposed Easter Seal. Our council has already gone on record as opposed to the sale of another seal in Minnesota, not because the council is opposed to the work for crippled children that is carried on by the Minnesota Association for Crippled Children, sponsor of the seal, but that duplication will inevitably weaken the seal as a means of raising funds. It is a method which belongs by right of years of use and development to the National Tuberculosis Association and its state units for the support of the tuberculosis movement.

Our intimate association with the Minnesota Public Health Association, affiliated unit of the National Tuberculosis Association in Minnesota, prompts us to regret particularly any encroachment on the part of any other organization, however reputable in itself, upon the Christmas Seal.

L. Sogge, Chairman
Committee on Public Policy and Legislation

The proposal for a state welfare board to co-ordinate all health and welfare activities will be studied by the Interim Committee from the Senate and House. It is quite likely that some such proposal will be brought before the next Legislature. There is a precedent for it in a few other states and a nation-wide demand on the part of some lay social workers for such boards.

It will be necessary for us to keep in constant touch with the members of the committee to be ready, if necessary, to act.

Monte Piper, Rochester
Travelogue

As secretary of the Olmsted-Houston-Fillmore County Medical Society, I visited fifty-two doctors in the course of a 600 mile tour within the three counties. Twenty-one of these were members; forty-two were in active practice. Twenty-nine were more than fifty years old and ten had been graduated from medical school since 1930. Twenty-five had been in practice more than thirty years.

These fifty-two men live and practice medicine in forty-two Minnesota towns with a population of 15,000 persons. That makes the average number of patients to a physician 1,544. (The average number for the state is about 800.)

The trip took us through a very beautiful section of Minnesota and yielded a great deal in the way of historical and human interest. Also a number of the non-members were persuaded to join the association.

Mr. Victor A. Christgau
WPA State Administrator

WPA has set up no clinics and no dispensaries. It is our policy to maintain the personal relationship between the WPA worker and his physician. In all cases of injuries in the course of WPA work, the patient is sent to his own doctor if he has one. To date, 650 doctors have treated WPA cases though there have been only nineteen injuries for every million man-hours of work.

Direct relief is cheaper than WPA, but it is not the "American way." By giving men work with a "security" wage (more than the dole, but less than they might obtain in private employ-

ment), we rehabilitate the spirit. The principle back of WPA should be adopted as a permanent policy for industry as well as for government.

If we had been ready with such a plan earlier, we could have maintained a stable economic situation. Now, at any rate, we are in a position to profit by unhappy experience. We can prevent future depressions by perpetuating this plan for work and security.

B. J. Branton
Malpractice

Some insurance companies who write malpractice insurance are leaving the state. Others are raising their premiums.

The function of the Medico-Legal Advisory Committee is to gather statistics, work out methods, instruct physicians. The object is to assist doctors to keep out of litigation. The trouble of one member belongs to all. We must lessen the number of cases and so lower our premiums. We should remember that 51 per cent of all malpractice cases start as a result of remarks made in some other doctor's office.

Mr. B. E. Youngdahl, SERA
Director Social Service

At present there are no fewer than nine distinct and separately administered state relief programs, several of them administered from Washington. Among them are the state relief set up by legislative act under the Executive Council; War Veterans' relief; WPA; Resettlement Administration; the State Soldiers' Home; Children's Bureau under the State Board of Control; old age assistance.

All of these have either little or no coördination with each other. *I am convinced that the lack of coördination among the various agencies will force an issue during the present year and that some legislation will be enacted to provide coördination at the next legislature.*

County is Responsible

Direct relief now becomes the responsibility of the county. It is possible that there may be as many as eighty-seven different types of medical aid. Any state relief agency that the Executive Council may set up to supervise expenditures will be supervisory only. *It will not have the power to say to the county commissioners, "you must do this or you must do that."* If

money is being wasted in the counties or spent improperly, then and only then can the Executive Council step in and refuse to make allocations.

Old Bills Will Be Paid

Outstanding relief bills of physicians will be paid on the old basis. In case of disputes the physicians involved should bring the matter to the relief office as soon as possible for adjustment and payment.

The new relief law makes no mention whatever of the Township System of handling relief. In the opinion of some, the new state law automatically eliminates the old township system in favor of relief on the county basis.

It should always be remembered that the 67,000 WPA workers are not eligible for direct relief. At the same time their security wage, averaging about \$44 a month, is not large enough to pay medical bills. The only recourse of medical men is to approach their own county commissioners with this problem and strike a bargain.

O. E. Locken
Crookston

We have heretofore neglected an important body in this state: the association of county commissioners. I went before that body yesterday to talk to them about a problem of which they obviously knew very little and cared less.

It is time for us doctors to educate these men about the true significance and importance of preserving to the patient the right of free choice of physician. We must make these commissioners see that any other basis for medical care will destroy a vital service.

It is also time for us to go to the physicians who are accepting contracts for care of the indigent from the county commissioners. We must persuade them to refuse such contracts in favor of better and safer plans.

W. W. Bauer, Director
Bureau of Public Health and Instruction
American Medical Association

The general objection to Federal subsidies lies in the following consideration: when Federal subsidies relieve local sources of public aid, the local sources dry up; under Federal subsidies, the control is centralized and the program loses local elasticity.

Federal agencies concerned with supervision of Social Security funds are eager to coöperate with the medical profession through its state agencies.

Each state association must handle its own problem, however. Upon a close coöperation with the physicians of each state will depend the worth of the new program made possible by these federal funds.

It is the doctor's responsibility and it is to his interest to see that money is not wasted.

There are certain functions of a public health program that have been recognized for a long time. They are still inadequately done or not done at all. Among these are: (1) control of communicable disease; (2) keeping vital statistics; (3) complete records; (4) control of tuberculosis and venereal diseases; (5) sanitation, protection of water, food, milk; (6) public health education.

A close relationship between organized medicine and the organized public health agencies will operate to keep new programs on a sound basis.

A. J. Chesley
State Health Officer

We propose to set up three full time health officers with several districts instead of individual counties under their jurisdiction. This is a requirement of the United States Public Health Service; public health funds available under Title Six cannot be used except under the jurisdiction of such officers.

About 47,000 dollars will be available out of the population grant for this purpose. This money is secured by matching it with existing state appropriations.

We shall not be able to avail ourselves of the additional funds set aside to be matched by new appropriations since there are no new appropriations (since January, 1935) for health service in Minnesota.

Plan Approved

Our plan for the maternal and child health program under Title Five of the Act has been approved in Washington. The amount of money available is still uncertain, though we understand that it will amount to about five-twelfths of the total appropriation for the year ending June, 1936.

The appropriation for crippled children under

the Children's Bureau of the Labor Department has not yet been acted upon by Congress. We assume that the money will be appropriated.

We shall be seriously embarrassed if these appropriations do not materialize. We need thoroughly trained nurses to carry out these programs as well as health officers and sanitary engineers. We shall need, also, a child hygienist, a pediatrician, a dental hygienist and a public health educator.

Fortunately, there will be an approved training center at the University of Minnesota. We can participate in the training of the personnel and we confidently expect that this will be a saving grace for the entire program.

I want to say a word to you about the proposed state welfare board. *Four times in the history of the state such a board has been proposed and defeated.*

If you want lay social workers running medical affairs, a central Welfare Board is the way to do it. *I am opposed to lay domination of essential medical and scientific procedures.*

The Council Meets

Free choice of physician is fundamental to good medical care for the indigent. The Council passed a resolution to this effect, directed President W. W. Will to write a letter to all county medical societies about it and county Committees of Three to make an earnest effort to persuade county physicians wherever they survive to withdraw.

First Aid

Red Cross First Aid Stations received approval of the Council with the following provisos: that all medical aspects of the program in each community be under the control of the County Medical Society; that the chairman of each first aid committee be a physician.

Alcohol Permit

At the suggestion of the State Liquor Commission, the Council recommended a new regulation for a \$1.00 alcohol permit for physicians. This permit would entitle the physician to purchase alcohol at wholesale prices.

Confidential

It is the opinion of Senior Surgeon R. R. Spencer of the United States Public Health

Service that the physician is in no way liable to suit for supplying information for statistical purposes in connection with the Chronic Disease Survey.

The Council listened to the Surgeon General's opinion but advised any physician who was in doubt, to ask for a written consent from his patient anyway before yielding confidential information.

Litigation Without Protection

Statistics from the records of three of the largest companies writing physicians' liability insurance in our state have been freely opened to your Medico-legal Advisory Committee. They show the marked increase in number of cases from year to year in Minnesota. The incurred loss ratios in one instance was 121.5 per cent in physicians' liability and 140.9 per cent in hospital liability insurance in a five-year period—the others showing losses far above earned premiums. These figures convince the committee that the increase in individual premiums is justifiable. Under present conditions, ceasing to write policies in certain parts of the state is good business on the part of the companies. We may well ask, what about the man who, a member of our association, is in active practice in these sections? Is he to be beset by the *fear of litigation without protection?*

That fear only one knows who has experienced it. As a result of it he cannot do the best work for his clientele; he is timorous about taking advantage of new advances in treatment, fearful of censure following each operative procedure and apprehensive that he may be the victim of undeserved criticism before a crowded courtroom for something over which he had no control.

With an unfortunate situation such as this, it is easy to see that not only the victim of the suit but the people in the locality as a whole suffer.

Confidence of the community in its physicians must be built up, not broken down. It will be broken down if physicians publicly criticise each other. County medical societies should take notice of members who give unfair testimony against other members. Mutual helpful understanding, and not discord, must be the aim of all members of our State Association if we are to

lessen the number of cases and reduce the yearly premiums.

"All for one and one for all," might well be our motto. Are we encouraging or discouraging malpractice litigation? Increasing or helping to decrease the cost of our neighbors' insurance? Can we say with Carlyle, "The courage we desire is not to die decently but to live manfully"?

MEDICO-LEGAL ADVISORY COMMITTEE.

Politician's Paradise

In a certain railroad town of 300,000 people there is a 1,600 bed hospital. This hospital is twenty-five stories high and very handsome (they used it for the highly polished and luxurious background of a popular medical movie not so long ago). Lights are on night and day on the top floor. Expense is no object. Medical care is free for all: no questions asked.

A former interne at this institution tells an interesting story which shows, among other things, what a sound political instrument can be built out of a well provided hospital; also what happens to medical standards and professional freedom when a politician is in charge.

In this case, the mayor of the town is the "angel." It is the Mayor's proud boast that "he takes care of his people." No one was ever turned away from His Honor's hospital.

Good Show

To prove it, there is always a shiny ambulance, a trig interne, a starchy nurse in attendance at his meetings to take care of His Honor's people. Incidentally, they make a better show than the police band or even the Boy Scout patrol.

The hospital is run by one of the mayor's friends as superintendent. There is a closed staff. There are six to eight resident physicians and ninety to 100 internes. The internes do most of the work. They receive no pay and they are busy day and night. They must go anywhere in the city to anyone who calls them in one of the ten ambulances maintained for the hospital by the mayor. But they have fine living quarters (there is a library for their use, though it has very few books) and they are well treated. Nurses are well housed and well treated, too, and

there is no difficulty in supplying either internes or nurses.

To Please the People

The object of the institution is first and foremost to please the people.

Naturally, the finer points of medical care are neglected. Teaching and research suffer. Naturally, also, internes, nurses, staff members, must do what they are told. On one occasion our friend, the interne, was washing up to operate when word came that he must go immediately and register to vote. He went and he was instructed how to vote.

Judged by scientific standards this fabulous institution falls short, of course. There were only 5 per cent of autopsies last year. Judged by numbers of patients, numbers of ambulances, numbers of almost anything else, it is certainly one of the outstanding institutions of the country.

Plenty of Money

Where does the money come from? From the railroads that are obliged to go through the town; from the government through the mayor's own relief arrangements for care of the sick poor. There is plenty of money. Staff members received stipends that vary from \$8,000 to \$12,000 a year—minus several thousands that must, of course, go back in tribute to His Honor the Mayor.

Here is a model for politicians to copy. Perhaps it is simply a forerunner of what State Medicine will mean in the United States. Certainly it is close enough in all respects to the Community Health Center advocated in the Majority Report of the Committee on Costs of Medical Care to warrant close study. What will happen when the other politicians wake up to the vote-getting possibilities of medical care?

Summer Round-Up

The Summer Round-up of the Children, annually promoted by the Parent-Teacher Associations, will begin shortly in Minnesota.

Its objective—to send the children to the opening grades of school or kindergarten in good physical and mental condition—has the sympathy and support of the medical profession.

Some of its methods have been open to ob-

jection in the past. But experience and the close coöperation between the national advisory committees of the Parent-Teacher Associations and the American Medical Association have ironed out most of the misunderstandings. Sponsors for the effort and the doctors who help them to carry it on are now well agreed on principles. They should work together harmoniously and effectively if both will follow the instructions for the 1936 campaign that are printed in the February *Bulletin of the American Medical Association*.

Every physician is urged to read this statement of purposes and the appended suggestions for local plans of action. If these plans can be put into general practice, each year will see a more and more solid foundation laid for the health of school children and for improved relations between children and their parents and the family doctor.

Minnesota State Board of Medical Examiners

St. Paul Woman Sentenced to Two Year Term at Shakopee

State of Minnesota vs. Mrs. Ida Bare.

Mrs. Ida Bare, forty-two years of age, entered a plea of guilty on March 4, 1936, before the Honorable R. A. Walsh, Judge of the District Court, of Ramsey County, Minnesota, to an information charging her with the crime of abortion. Judge Walsh sentenced Mrs.

Bare to a term of not to exceed two years at hard labor at the Woman's Reformatory at Shakopee.

Mrs. Bare, who lived at 457 Rice St., Saint Paul, and who had no medical training except a little knowledge gained as a practical nurse, attempted on February 18,

1936, to perform an abortion on a thirty-two year old Saint Paul woman. The uterus was punctured by the use of a catheter, resulting in the almost instantaneous death of the patient. The cause of death was given as air embolism following an induced abortion. There was no evidence to connect this defendant with any other offense and she was permitted to plead guilty to abortion rather than manslaughter. Judge Walsh also saw fit to limit the sentence to two years rather than the statutory maximum of four years.

Splendid coöperation was received by the Minnesota State Board of Medical Examiners from Dr. C. A. Ingerson, Coroner of Ramsey County, and from Mr. M. F. Kinkead, County Attorney, James F. Lynch, Assistant County Attorney, and Detective Alvin Johnson, assigned to the County Attorney's office.



Polk County "Naturopathic Physician" Convicted By Jury

State of Minnesota vs. "Dr." Knute H. Luross.

Knute H. Luross, forty-three years of age, was convicted on March 12, 1936, by a jury in the Court of the Honorable James E. Montague, Judge of the District Court for Polk County, Minnesota. Luross for several years has maintained an office at Fosston, Minnesota, where he has practiced as a naturopathic physician. He has carried the following advertisement in the Fosston newspaper:

DR. K. H. LUROSS
NATUROPATHIC PHYSICIAN

All chronic and acute diseases successfully
treated by Latest Natural Methods.
Hillestad Hardware Building

Phone 182 Fosston

The defendant was first arrested June 3, 1931, following an investigation by the State Board of Medical Examiners, on a charge of practicing healing without a basic science certificate. In order to accommodate the naturopaths in their desire to have the Basic Science Law tested in the Supreme Court, a continuance was agreed to and a mandamus suit was commenced by one W. W. Shenk against the Basic Science Board. The purpose of this suit was to obtain a basic science certificate for a naturopath (Shenk) without an examination. The naturopaths lost in the District Court of Hennepin County, and they also lost in the Supreme Court of Minnesota. It was understood that in the event the Shenk case was lost by the naturopaths, Luross would enter a plea of guilty. He refused to do this and a new case was instituted because of the lapse of time occasioned by the appeal in the Shenk case.

Luross continued to practice healing at Fosston, Minnesota, and on January 22, 1935, following another investigation, a complaint was filed against him under the Basic Science Law. Luross claims to be a graduate chiropractor from the Palmer School of Davenport, Iowa. He was unable to secure a chiropractic license in Minnesota and for some reason or other has not taken the Basic Science examination, although the only requirements to take the Basic Science examination are that the applicant be twenty-one years of age, that he have a high school education and be of good moral character. From 1927 to 1929 Luross held a massage license but did not renew it in 1930 when the masseurs were under the jurisdiction of the State Board of Medical Examiners. He has remarked on several occasions that no jury in Polk County would convict him; perhaps his opinion in this respect has been corrected. At the trial Luross did not take the witness stand and the evidence was uncontradicted that the defendant referred to himself as a doctor, naturopathic physician, and that he maintained an office at Fosston for the practice of healing. Judge Montague granted a stay of thirty days to give the defendant and his counsel an opportunity to determine whether or not they wished to appeal the case to the Supreme Court. The Court has not imposed sentence on account of the stay in the proceedings. The defendant is to refrain from the practice of healing in any manner during the pendency of the stay.

The defendant was represented by Mr. W. E. Rowe, Crookston attorney, and by Mr. John I. Davis from Benson, Minnesota. Mr. Davis will be remembered as the lawyer who represented "Dr." Robert McGraw, negro quack who formerly operated at Winsted, Villard and Hewitt, Minnesota. Mr. Davis spent most of his time, in his arguments to the jury in the Luross case, denouncing the persecution of Luross and attributing it to the medical profession. In his argument to the

Court Mr. Davis contended that there was no Basic Science Board lawfully in existence, but Judge Montague overruled his objections and ordered the case submitted to the jury.

The case was tried for the State in a very splendid manner by Mr. Francis H. Stadsvold, County Attorney of Polk County. Mr. Stadsvold will be remembered by many members of the medical profession as the "Dobie" Stadsvold of basketball fame at the University of Minnesota along about 1911. Mr. Stadsvold was elected County Attorney of Polk County, Minnesota, in 1934, and he has been very successful in his court work.

List of Physicians Licensed by the Minnesota State Board of Medical Examiners on February 13, 1936

By Examination

BALKIN, Samuel George, U. of Minn., M.B., 1935, Minneapolis, Minn.
 BATTIS, Martin, Jr., U. of Mich., M.D., 1933, Rochester, Minn.
 BELL, Elexious Thompson, U. of Missouri, M.D., 1903, Minneapolis, Minn.
 BLAKE, James Alexander, U. of Minn., M.B., 1934; M.D., 1935; Hopkins, Minn.
 BRYCE, William Fielding, Jr., Med. Col. of Va., M.D., 1934, Rochester, Minn.
 BUSSEY, Charles Dan, Rush Med. Col., M.D., 1934, Rochester, Minn.
 CAMPBELL, Samuel Joseph, Tulane U., M.D., 1933, Rochester, Minn.
 CHEW, Eric MacMillan, U. of Pa., M.D., 1933, Rochester, Minn.
 COHEN, Bernard Albert, U. of Minn., M.B., 1934, Minneapolis, Minn.
 CRISLER, George Russell, U. of Chicago, M.D., 1931, Rochester, Minn.
 DEEDS, Charles Douglas, U. of Cincinnati, M.D., 1934, Rochester, Minn.
 DENNIS, Clarence, Johns Hopkins, M.D., 1935, Minneapolis, Minn.
 ECKSTEIN, Arthur W., Northwestern, M.D., 1912, Mankato, Minn.
 ELKINS, Earl Cook, Geo. Washington U., M.D., 1933, Rochester, Minn.
 FAIRCHILD, Robert Durkee, Rush Med. Col., M.D., 1934, Rochester, Minn.
 FARTHING, John Watts, U. of Pa., M.D., 1933, Rochester, Minn.
 FRIEDEL, Hymen Louis, U. of Minn., M.B., 1935, Minneapolis, Minn.
 GARRETT, Leslie Moyers, Vanderbilt U., M.D., 1933, St. Paul, Minn.
 GUERNSEY, Chester Meredith, U. of Minn., M.B. and M.D., 1934, Rochester, Minn.
 GUNDERSON, Harold Julian, Northwestern U., M.B., 1933; M.D., 1934; Rochester, Minn.
 HALL, Byron Ellsworth, U. of Pa., M.D., 1933, Rochester, Minn.
 HAMMAR, Lawrence Michael, U. of Minn., M.B., 1935, Minneapolis, Minn.
 HEFFNER, Reid Russell, Johns Hopkins U., M.D., 1931, Rochester, Minn.
 INGHAM, Donald William, Temple U., M.D., 1933, Rochester, Minn.
 JACOBS, Lewis Grant, Jr., Stanford U., M.D., 1932, Minneapolis, Minn.

KERR, Jack Graves, Baylor U., M.D., 1931, Rochester, Minn.
 KOSCHNITZKE, Herman Kaiser, U. of Minn., M.B., 1935, Minneapolis, Minn.
 LEEMHUIS, Glenn H., U. of Minn., M.B., 1935, St. Paul, Minn.
 LEMON, Robert George, U. of Ill., M.D., 1935, Rochester, Minn.
 LOVELADY, Sim Bedford, Tulane U., M.D., 1934, Rochester, Minn.
 MACKENZIE, Walter Campbell, Dalhousie U., M.D., 1933, Rochester, Minn.
 MAKSIM, George, Jr., Temple U., M.D., 1933, Rochester, Minn.
 MARCLEY, David McMillan, U. of Minn., M.B., 1934; M.D., 1935; Rochester, Minn.
 McEWAN, Alexander, U. of Pittsburgh, M.D., 1933, Rochester, Minn.
 McLENNAN, Charles Ewart, U. of Minn., M.B. and M.D., 1934, Minneapolis, Minn.
 MEDOF, Sidney Howard, U. of Minn., M.B., 1935, Minneapolis, Minn.
 MURPHY, Edmund Patrick, McGill U., M.D., 1935, Minneapolis, Minn.
 O'BRIEN, William Martin, St. Louis U., M.D., 1933, St. Paul, Minn.
 PEARSON, Malcolm Montieth, U. of Minn., M.B., 1935, Minneapolis, Minn.
 PETERSON, Stanley Carl, U. of Minn., M.B., 1935, Minneapolis, Minn.
 REIMANN, Hobart A., U. of Buffalo, M.D., 1921, Minneapolis, Minn.
 RICHEY, Granville Leon, Indiana U., M.D., 1934, Rochester, Minn.
 RILEY, John Branson, U. of Minn., M.B. and M.D., 1934, Big Fork, Minn.
 RHORER, Roger Jerome, Northwestern U., M.B., 1933; M.D., 1934; Rochester, Minn.
 ROSENBERG, Edward Frank, Jefferson Med. Col., M.D., 1934, Rochester, Minn.
 SHELDEN, Charles Hunter, U. of Pa., M.D., 1932, Rochester, Minn.
 SIMPSON, Wyatt Collier, Harvard U., M.D., 1931, Rochester, Minn.
 SMITH, Caleb Howard, U. of Pa., M.D., 1933, Rochester, Minn.
 SNYKER, Omer Edward, Loyola U., M.D., 1935, Ely, Minn.
 SODERSTROM, Edwin Morris, Stanford U., M.D., 1931, Rochester, Minn.
 STONE, Samuel Newton, Jr., U. of Pa., M.D., 1932, Rochester, Minn.
 WEINER, Harry, U. of Minn., M.B., 1932; M.D., 1933; Fort Lincoln, N. D.

By Reciprocity

FERGUSON, William Cyril, U. of Neb., M.D., 1934, St. Paul, Minn.
 KRUSEN, Frank Hammond, Jefferson Med. Col., M.D., 1921, Rochester, Minn.

National Board

BIRGE, Henry Leonard, U. of Pa., M.D., 1933, Rochester, Minn.
 HEDLUND, Charles John, U. of Wash., Mo., M.D., 1934, Cambridge, Minn.
 RICE, Hagbart Goetz, U. of Minn., M.B. and M.D., 1935, Moorhead, Minn.

OF GENERAL INTEREST

Dr. Mary L. Ghostley has been reappointed Superintendent of the Lake Julia Sanatorium, Puposky, Minnesota.

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Dr. E. W. Senn of Owatonna was recently unanimously re-elected as head of the school board in Owatonna.

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Dr. L. H. Hedenstrom of Cambridge has returned to his practice following a three months' sojourn in Denver, Colorado.

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Dr. E. A. Heiberg of Fergus Falls, who has been seriously ill for several weeks at St. Luke's Hospital, Fergus Falls, is reported to be recovering.

* * *

Dr. U. S. Anderson, recently of the Nicollet Clinic, Minneapolis, has become associated with the Austin Clinic, where he will specialize in surgical work.

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Dr. E. M. Hill, who has practiced for the last few years at Rushford, Minnesota, has moved to Big Timber, Montana, where he will continue the practice of medicine.

* * *

Dr. H. W. Havel has reopened his medical offices in Jordan following a six months' stay in Kansas, where he served as post physician at one of the army posts for that period.

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The Mantoux test has been given by the local profession in Stillwater, Minnesota, to the Senior and Junior students in the high school. This is a regular yearly procedure.

* * *

Dr. G. W. Bohl of Ada, Minnesota, has purchased the former residence of Dr. Holmes, which he and Mrs. Bohl will occupy as a residence and where he will have his professional offices.

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The University Hospital has recently acquired a new hypertherm machine made available through a grant from Charles F. Kettering of Dayton, Ohio, and the medical work of Dr. Walter Simpson.

* * *

Dr. E. J. Tanquist, head of the Douglas County Hospital, Alexandria, Minnesota, has returned from Chicago, where he spent several weeks at the Cook County Graduate School in the study of urology.

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Dr. Joseph S. Emond, graduate of the University of Minnesota, 1933, recently completed a two-year post-graduate course and will practice in Farmington, Minnesota, where he established offices last month.

* * *

Dr. M. G. Ericsson, a graduate of the University of Minnesota medical school, 1934, who has been located in Chicago, Illinois, the past year, has opened offices in Long Prairie, Minnesota, for the practice of medicine in that community.

Dr. L. M. Roberts of Little Falls suffered a broken shoulder and fractured ribs Friday, March 6, when the airplane in which he was taking a patient to Rochester, Minnesota, crashed near Sleepy Eye. Dr. Roberts, according to last reports, is recovering nicely.

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On invitation of local Ophthalmological Societies in Louisville, Nashville and Atlanta, Dr. Charles N. Spratt of Minneapolis demonstrated, by means of motion pictures, his method of operating for cataract and glaucoma, at meetings held March 12, March 16 and March 26.

* * *

Special courses in public health work have been established at the University of Minnesota beginning with the spring quarter. These courses have been made possible through receipt of a gift of \$13,250 from the United States public health service early in March for that purpose.

* * *

Dr. J. A. Myers, Minneapolis, is giving a series of lectures on tuberculosis before the following organizations this month: California Tuberculosis Association, Sacramento, April 2; Oregon Tuberculosis Association, Portland, April 3; Nebraska Tuberculosis Association, Lincoln, April 6.

* * *

Dr. A. J. Lenarz, a graduate of the University of Minnesota, who has been practicing in Sauk Rapids, since July, 1935, has moved to Browerville, where he has taken over the practice of Dr. M. E. Mosby. Dr. Mosby has purchased the hospital at Long Prairie, Minnesota, where he is now located.

* * *

According to a recent report of the U. S. bureau of census the operation and maintenance of the health department in Minneapolis for 1934 cost \$1.85 per capita, the total cost for the year being \$885,131. On the basis of the per capita cost Minneapolis ranked fourth among thirteen cities of comparable size.

* * *

Through the activities of the Washington County Medical Society and the P. T. A., a hearing survey has been conducted by Dr. Horace Newhart of Minneapolis in the Stillwater, Oak Park, and Bayport schools. Altogether, 2,083 tests were made, of which 152 showed more or less defective hearing. The School Board is assuming the expense of this survey.

* * *

Dr. Raymond B. Allen, former fellow in urology at the Mayo Foundation, has been appointed dean of the Detroit College of Medicine, Detroit, Michigan. Dr. Allen, a graduate of the University of Minnesota, received his Ph.D. fellowship at Rochester, Minnesota, in 1933. He has been associate dean of Columbia University medical school since 1934.

* * *

Word has been received of the death of Dr. A. E. Pierce of Minot, North Dakota, who passed away March 16. Dr. Pierce received his degree in medicine at the University of Minnesota in 1924 and following several years of post-graduate study in Europe located

first in Kansas City, Missouri, and then in Minot. He is survived by his wife, his parents and one sister.

* * *

Dr. C. G. Ochsner has returned to Wabasha, Minnesota, to resume his general practice of medicine and surgery in copartnership with Dr. B. J. Bouquet. Dr. Ochsner went to Chicago last December to become associated with Dr. Andre Stapler. The sudden death of Dr. Stapler terminated this association and Dr. Ochsner decided to return to his former location in Wabasha.

* * *

Largely through the efforts of Dr. J. H. Dudley of Windom, Minnesota, chairman of the Cottonwood County Public Safety Commission, his county has won a bronze award for a low traffic accident fatality rate with credit for traffic accident prevention work in 1935. The presentation of the awards will be made by the Minnesota Public Safety Commission at a dinner meeting in Saint Paul, Tuesday, April 14.

* * *

Dr. J. J. Gelz and Dr. W. T. Wenner of St. Cloud have announced the association of Dr. Joseph B. Gaida with them in the practice of eye, ear, nose and throat work. Dr. Gaida is a graduate of the University of Minnesota, 1931, and has practiced at Kilkenny, Minnesota, before taking postgraduate work in eye, ear, nose and throat at the University and later serving as house surgeon for the same diseases at Ancker Hospital, Saint Paul.

* * *

With the heavy fall of snow experienced in the last few weeks in Minnesota several stories concerning the experiences of the country doctor in getting to his patients have been received. Dr. J. C. Feuling of Bovey was obliged to use snow shoes to get to a patient living on a farm off the main highway. Another doctor in Albert Lea drove through a blinding snowstorm as far as was possible in his automobile and then used horses and a wagon to bring his patient back to the highway and thence by automobile to the hospital. Others are reported using special sleigh runners on automobile bodies to traverse the drifted roads and byways. The vicissitudes of the pioneer doctor are still present in the country districts, it seems.

* * *

Extension Course in Refraction

A four-weeks' course in Elementary Refraction, designed especially to appeal to rural medical practitioners (graduates of medicine, only) who might wish to supplement their general practice in medicine by work in the field of refraction and physiologic optics, will be given May 4 to 30, 1936, at the University Medical School, provided a sufficient number of registrations is received. This course will be under the supervision of the Department of Ophthalmology. The registration will be limited to ten physicians. In addition to formal instruction in refraction, provision has been made to give participating doctors opportunity to examine patients at the Wilder Foundation in St. Paul and at the University, Ancker and city outpatient clinics.

The fee for the course of four weeks will be \$80.00, \$50.00 to be deposited with the application, \$30.00 on

registration. Applications and reservation fees should be sent in immediately. Reservation fees will not be returned once a place is held for any applicant although, if a substitute reservation is made, transfer of the application fee may be arranged. Registration fees should be paid by April 27.

Further information may be obtained from Dr. R. R. Price, Director of University Extension, University of Minnesota.

* * *

Dr. Scofield Honored

Dr. C. L. Scofield of Benson was honored with a testimonial banquet sponsored by the Benson Chamber of Commerce, Monday evening, March 9, 1936, commemorating his fifty years of service as a physician and his outstanding community service during forty-six years of residence in that city. Dr. W. A. O'Brien, associate professor of pathology at the University of Minnesota, gave the principal address. Dr. A. J. Chesley of the Minnesota State Board of Health, and Dr. E. A. Meyerding, secretary of the State Medical Association, both co-workers of Dr. Scofield in state public health work for many years, gave short talks, as did Mayor George S. Tait and Dr. Oscar Daignault of Benson.

Dr. Scofield became interested in public health work in 1906 and was one of the organizers of the Minnesota State Sanitary Conference that year. He has been a member of the Minnesota Public Health Association since its organization in 1907 and served as president from 1919 to 1923. Dr. Scofield served as a member of the State Board of Health for twelve years and was president of the Board for four years. He has been a member of the House of Delegates of the State Medical Association for twenty-five years and served as secretary of the Swift-Kandiyohi-Meeker Medical Society for several years. He has served as county health officer, city health officer, school physician, local surgeon for the Great Northern Railway, county coroner and as chairman of the public health committee of the Red Cross.

In addition to his interests in the health of his community Dr. Scofield has been active in many civic organizations. He was president of the village council in 1897, when the first water tower was built and the sewer system was widely extended. He is recognized as the father of the Benson park system and served on the park board for a number of years. He was chairman of the charter commission that in 1908 drew up the city charter which is still in effect. He was a member of the Board of Education for fifteen years, acting as president at one time.

His activities include Boy Scout work, organization of the Swift County Historical Society, participation in the promotion of athletic activities in the community and membership in numerous clubs and lodges.

Dr. Scofield was born on a farm near Cannon Falls, Minnesota, April 16, 1865, and will celebrate his seventy-first birthday this month. His medical education was received at the University of Iowa, where he was graduated in 1886. He started to practice in Saint Paul but moved to Benson in 1890, where he has practised ever since.

OBITUARY

Walter Jay Richardson
1856-1936

DR. W. J. Richardson died at his home in Fairmont, Minnesota, on February 20, 1936, at the age of seventy-nine, having practiced in Fairmont for forty-five years. He had been in failing health since last spring when he fell and sustained fractures of his lower vertebrae.

The great grandson of Benjamin A. Richardson, a soldier in the Revolutionary War, Walter Jay Richardson was born near Rochester, New York, November 17, 1856. He attended Carleton College, Northfield, Minnesota, and later received his A.B. degree from Amherst College. He began the study of medicine, in 1882, at Harvard, where he was a student under Dr. Oliver Wendell Holmes. He later attended the College of Physicians and Surgeons in New York, where he received his M.D. degree in 1885.

He began practice in Minneapolis but later moved to Hutchinson and from there went to Fairmont, where he established a prosperous practice.

Besides his wife, Dr. Hutchinson is survived by three children, Mrs. William Simpson of Silver Lake township; Mrs. Lawrence Cowdray of Syracuse, New York, and D. B. Richardson of Fairmont. One daughter, Lydia, died in infancy, and a son, Ralph, died some years ago, in New York.

Verner Paul Johnson
1902-1936

DR. Verner P. Johnson, physician at Delano, Minnesota, for the past seven years, died Wednesday, March 18, 1936, at Fairview Hospital, Minneapolis, where he had been a patient for several weeks.

Verner Paul Johnson was born in Minneapolis, February 16, 1902, the son of Charles and Ida Blomberg Johnson. He was educated in the Minneapolis schools and graduated from South High School in 1919. He then engaged in teaching a village school in South Dakota and in 1920 enrolled as a student in medicine and surgery at the University of Minnesota, graduating in 1926. He served his internship at the New York Naval Hospital, where he was commissioned as a medical officer with the rank of lieutenant and after one year was transferred to China and spent eighteen months in the Orient. He was then transferred to the Great Lakes station, where he resigned his position.

Dr. Johnson located in Delano in 1929, where he practiced until the time of his death. He was a member of the Minnesota State Medical Association and president of the Wright County Medical Society.

In 1927 Dr. Johnson married Eleanor Downkott, who with two sons, Robert Paul and George Burton, survives him. He is also survived by his parents, Mr. and Mrs. Charles Johnson of Minneapolis, a brother Carl, and a sister, Mrs. Astrid Griffin, also of Minneapolis.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for April

The Minnesota State Medical Association broadcasts weekly at 10:00 A.M. every Monday over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

- April 6—Hay Fever
- April 13—Rheumatic Fever
- April 20—Narcolepsy
- April 27—Sore Mouth

Wabasha and Winona County Joint Meeting

The eleventh annual dinner tendered by the Sanatorium Commission, and the fifth annual joint meeting of the Wabasha and Winona County Medical Societies was held at Buena Vista Sanatorium, Wabasha, Monday evening, March 16. There were thirty-three in attendance. Dr. C. G. Ochsner, president of the Wabasha County Medical Society, presided as toastmaster.

The following program was presented:

"Some of the Problems of the Minnesota State Medical Association"—Dr. W. W. Will, President of the State Association, Bertha.

"Social Security Programs Pending in Minnesota"—Mr. R. R. Rosell, Saint Paul, substituting for Dr. E. A. Meyerding.

"Practical Treatment of Anemias"—Dr. Charles H. Watkins, Rochester.

"Infectious Mononucleosis"—Dr. Frank J. Heck, Rochester.

Previous to the dinner, a short special session of the Wabasha County Medical Society was held, at which time Dr. B. J. Bouquet of Wabasha was admitted to membership.

Washington County Society

The second fracture lecture sponsored by the Washington County Medical Society was given on February 11, by Dr. Victor Hauser of St. Paul. Dr. Hauser outlined the diagnosis, treatment, and prognosis in fractures and injuries to the knee, leg, and foot. He showed a large number of x-rays, pointing out the difficulties of treatment and also the ultimate results.

The third fracture lecture was given on March 10 by Dr. Alexander Colvin of St. Paul, who took up fractures and injuries to the head. He quoted several authorities, pro and con, diagnosis and treatment, but mostly cited his own large experience with such injuries. He especially dwelt on the difficulty of making diagnosis from symptoms and emphasized the value of x-ray and spinal puncture and of a careful watching. Dr. Colvin also stated that no treatment, surgical or otherwise, would have been of any avail in patients dying from injuries six hours after such injury had been sustained.

Minnesota State Medical Association

The eighty-third annual meeting of the Minnesota State Medical Association will be held in Rochester, Minnesota, May 3, 4, 5, and 6, 1936, with headquarters at the Kahler Hotel. The tentative program for the meeting is as follows:

PROGRAM

Business Session

KAHLER HOTEL

Sunday, May 3

Council
Reference Committee

Sunday Evening

House of Delegates

Monday, May 4

Council

Tuesday, May 5

House of Delegates
(Luncheon)
Council

Wednesday, May 6

General Assembly

Presentation of Officers

Scientific Session

Monday, May 4

Morning Session

Clinics by the Mayo Staff
Scientific Demonstrations and Exhibits
The Cancer Problem

Speaker to be announced.

Citizens Aid Society Memorial Address
Luncheon

Afternoon Session

Functions of the Spleen

LEON ASHER.....Berne, Switzerland
Professor of Physiology, University of Berne
Director of the Physiological Institute of Berne

Foreign Bodies and the Use of X-ray Examination in their Localization and Removal

WILLIS F. MANGES.....Philadelphia
Russell D. Carman Memorial Lecture
Minnesota Radiological Society, Sponsor

The Treatment of Gall Tract Disease as Determined by the Stage of its Development and the Patient's General Condition

E. L. TUOHY.....Duluth

Scientific Demonstrations and Exhibits

Hay Fever Symposium on the Causes, Diagnosis and Treatment

C. O. ROSENDAHL, Ph.D.
R. V. ELLIS
H. B. SWEETSER, JR.
Minneapolis

Oxygen Therapy

O. E. LOCKEN.....Crookston

A Few Axioms in Dermatological Diagnosis

H. E. MICHELSON.....Minneapolis

Management of the Minor Ailments of Pregnancy

M. O. WALLACE.....Duluth

Congenital Heart Defects. Importance of Early Diagnosis

H. J. LLOYD.....Mankato

The Management of Appendicitis

E. A. REGNIER.....Minneapolis

Evening Session

8:00 P. M.

METHODIST CHURCH

Medical Economics Meeting

Presiding Officer, W. W. WILL, President

Address of Welcome

C. W. MAYO.....Rochester
President of the Olmsted-Houston-Fillmore-Dodge
County Medical Society

President's Address

W. W. WILL.....Bertha

The Women's Auxiliary

MRS. E. M. HAMMES, President-Elect.....St. Paul

Address

OLIN WEST.....Chicago
Secretary and General Manager of the American
Medical Association

Address

J. TATE MASON.....Seattle
President-Elect of the American Medical Association

Tuesday, May 5

Morning Session

Clinics by the Mayo Staff

Scientific Demonstrations and Exhibits

The Treatment of Diabetes

ELLIOTT P. JOSLIN.....Boston
Professor of Medicine, Harvard University
Medical School

Luncheon

Afternoon Session

Subject to be Announced

FERDINAND SAUERBRUCH.....Berlin, Germany

Studies in Water Balance, Dehydration and the Administration of Parenteral Fluids

F. A. COLLIER.....Ann Arbor
University of Michigan

The Rôle of Duodeno-jejunosomy for Duodenal Ileus and Duodenal Obstruction

G. A. EARL.....St. Paul

Scientific Demonstrations and Exhibits

Regional or Terminal Ileitis

O. J. HAGEN.....Moorhead

Barbiturates and Complementary Drugs for the Production of Obstetrical Amnesia and Analgesia

J. J. SWENDSON.....St. Paul

Blood Transfusion

E. N. PETERSON.....Eveleth

'Bumper' Fractures of the Tibia

O. J. CAMPBELL.....Minneapolis
Erythema Multiforma, Complicated by Severe Gastro-intestinal Disturbances and Hemorrhage from Mucous Membranes in a Primipara

W. G. WORKMAN.....Tracy
The Surgical Treatment of Hydronephrosis, a New Operation for the Relief of Uretero-pelvic Junction Stricture

F. E. B. FOLEY.....St. Paul
Changes in Aortic Shadows Following Injuries to the Spine

M. H. TIBBETTS.....Duluth

Evening Session

8:00 P. M.

THE ARMORY

Social Evening

C. W. MAYO, Presiding Officer

The entire exhibit of crime detection methods prepared by the Federal Bureau of Investigation of the United States Department of Justice has been sent here by J. Edgar Hoover, Director.

There will be a talk on crime detection methods by one of the Bureau's "G" men and an ample opportunity to inspect the exhibit.

This will be a social evening for members and their guests.

Wednesday, May 6

Morning Session

Clinics by the Mayo Staff

Scientific Demonstrations and Exhibits

The Surgical Aspects of Peptic Ulcer

DONALD GUTHRIE.....Sayre, Pa.
 The Guthrie Clinic, The Robert Packer Hospital, Sayre, Pa.

Luncheon

Afternoon Session

Diagnostic and Therapeutic Problems in Heart Disease in Children

M. J. SHAPIRO.....Minneapolis
Correlations Between Variations in Barometric Pressure and Incidence of Cerebral Hemorrhage

G. R. KAMMAN.....St. Paul
The Roentgen Findings in Biliary Fistula

L. G. RIGLER.....Minneapolis
Myxedema, Its Nervous and Mental Manifestations

G. N. RUHBERG.....St. Paul

Scientific Demonstrations and Exhibits

Ovarian Hemorrhage Simulating Acute Appendicitis

C. H. MEAD.....Duluth

Active Pulmonary Tuberculosis Without Symptoms

E. K. GEER.....St. Paul

Upper Abdominal Pain—Its Occurrence in Acute Gonorrheal Pelvic Inflammatory Disease

R. A. JOHNSON.....Minneapolis

Medical Question Court

W. A. O'BRIEN.....Minneapolis
 Chairman

A group of Eminent Specialists in the Various Lines will assist Dr. O'Brien

State Meeting Exhibits

The United States Army and Navy, as well as the Department of Justice, will be represented among the many outstanding exhibits arranged for the eighty-third annual meeting of the Minnesota State Medical Association in Rochester, May 4, 5 and 6.

The Army and Navy, both of which have officers stationed at the Mayo Clinic, will have an extensive exhibit featuring medical equipment and methods of treatment in time of emergency. There will be a demonstration by the inventor, Commander Joel White of the Navy, of apparatus to prevent carbon monoxide poisoning entering airplane cabins.

This exhibit will also include a demonstration of fitting army shoes with x-rays to show the effect on the feet when loads are carried on the back. This will be carried on under the supervision of army officers with Lieutenant-Colonel Henry W. Meyerding of the Mayo Clinic in charge.

A large hospital tent will be pitched on the grounds at St. Mary's hospital where the exhibit will be placed. Men will be on duty and ambulances at hand. Several rooms in the hospital will be occupied by the exhibit where small models of incinerators, sanitary equipment and dispensary equipment will be on display.

The exhibit should be of special interest to members of the medical profession now in the medical corps and also to those who go into rural sections where army methods are helpful. It is under the direction of Lieutenant-Colonel F. L. Smith.

A crime exhibit from the Bureau of Investigation, of which J. Edgar Hoover is in charge, will include finger-printing, ballistics and every phase of crime detection. An expert on crime from Mr. Hoover's department will talk on this subject at a special meeting Tuesday night in the Armory.

An especially interesting exhibit will be one on fever therapy by Dr. A. U. Desjardins and Dr. W. C. Popp. Charts and slides of this new method of treatment will be shown, and twice a day illustrated lectures will be given. Groups of six will be given an opportunity to visit the Fever Therapy Department at St. Mary's Hospital and to see the treatment actually being given to patients. Appointments must be made for these special visits.

An exhibit and demonstration of diagnostic tests, the Mantoux test, Dick and Schick tests and their interpretations will be put on by Dr. H. F. Helmholtz and the Committee on Public Health Education. Actual patients will be used for demonstration. In view of the importance of this phase of preventive medicine, attention of physicians is called to it at this time when expanded public health programs will make possible greatly increased immunization work in Minnesota.

Dr. Frank H. Krusen, Rochester, will have an exhibit on physiotherapy, and Dr. L. A. Buie will give daily lectures on proctology in connection with his exhibit including charts and wax models. There will be a large number of other interesting exhibits and scientific demonstrations.

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of February 12, 1936

THE regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, February 12, 1936. The meeting was called to order by the President, Dr. Thomas S. Roberts, at 8:10 p. m.

There were forty-four members present.

Minutes of the January meeting were read and approved. Dr. W. F. Braasch read the following Memorial to the late Dr. Judd, and a motion was carried that this be made a part of the permanent records of the Academy and a copy sent to Mrs. Judd.

Edward Starr Judd 1878-1935

With the death of Edward Starr Judd from pneumonia on November 30, 1935, the world lost one of its most outstanding surgeons and humanity one of its benefactors. Dr. Judd was born in Rochester, Minnesota, July 11, 1878, son of Edward F. and Emma J. Judd. He was educated in the public schools in Rochester, and received the degree of Doctor of Medicine from the University of Minnesota Medical School in 1902. He served his internship in St. Mary's Hospital in Rochester, and became first assistant to Dr. C. H. Mayo. Later he was appointed head of one of the sections in the Division of Surgery in the Mayo Clinic, as well as surgeon at St. Mary's Hospital. He was made Professor of Surgery in the Mayo Foundation Graduate School of the University of Minnesota in 1920. During the war he was director of the school of instruction for officers and enlisted men of the medical corps stationed in Rochester.

He was married to Miss Helen Berkman of Rochester in 1908, and she with their five children survive him.

Dr. Judd was a member of the Minnesota State Medical Association, the American Surgical Association, the Western Surgical Association, the Society of Clinical Surgery, the American Medical Association, the American College of Surgeons, the Interurban Surgical Association, the Southern Surgical and Gynecological Association, the Southern Minnesota Medical Association, the Minnesota Academy of Medicine, the Minnesota Pathological Society, the Association of Resident and Ex-Resident Physicians of the Mayo Clinic, Sigma Xi, Alpha Kappa Kappa, and was a member of several societies in foreign countries. He was given the degree of Doctor of Science by the University of Maryland in 1934.

Seldom has the loss of a physician caused such sincere and widespread sorrow among members of the medical profession and laity alike. There was a depth and sincerity in his personality which endeared itself to all who came in contact with him. He was unassuming in his manner and modest almost to self-effacement. If ever there lived a man who loved the truth and despised falsehood and pretension, it was Starr

Judd. He was a man's man and was most happy when among them. He was fairly worshiped in the circle of his intimate friends. A striking example of the unique popularity which he enjoyed among his colleagues was shown by his election to the presidency of the American Medical Association by virtual acclamation and against his wishes.

Apt pupil of the great masters of surgery, Doctor Will and Charles Mayo, he took full advantage of his opportunities. Because of his technical skill and sound surgical judgment he was generally regarded as one of the world's leading surgeons. He took keen interest in many of the younger men who had their training under him, many of whom have since become prominent surgeons. In keeping with his wide scientific interests, he spent much of his leisure time in recent years in following and encouraging the work carried on in experimental laboratories. His scientific contributions to periodical medical literature and to many textbooks number more than three hundred and have left a lasting impression on contemporary American surgery. These and the memory of his many fine qualities of mind and character will keep his influence alive for years to come.

The Committee: D. C. BALFOUR,
WALTMAN WALTERS,
WILLIAM F. BRAASCH.

The scientific program followed.

THE RELATION OF RETINAL CHANGES TO THE SEVERITY OF THE ACUTE TOXIC HYPERTENSIVE SYNDROME OF PREGNANCY

ROBERT D. MUSSEY, M.D.
Rochester

Dr. Mussey gave his Inaugural Thesis on the above subject.

Abstract

The changes occurring in the retinae of women suffering from the acute toxic hypertensive syndrome of pregnancy, commonly called pre-eclamptic toxemia, have been noted by a number of observers. Evidence is presented from a number of investigators which indicate that in both the non-convulsive and convulsive forms of this syndrome there is a general systemic vascular change as revealed by a study of the pre-capillary vessels of the nail fold, the renal glomerular tufts, and the retinal arterioles.

Wagener has also stated that in cases of toxemia of pregnancy in which there is an associated rise in blood pressure, changes may be seen both in the retinal arterioles and in the retina proper. The changes in the arterioles appear first and those in the retina proper, commonly called "retinitis," are secondary to, and ap-

currently dependent on, the changes in the arterioles. The caliber of the arterioles appears narrowed and the lumen is reduced, because of spastic contraction and increased tonus of the walls of the arterioles. This change in the arterioles may disappear entirely if there is early and permanent fall in blood pressure. The constriction soon becomes fixed if the toxemia progresses. When the constriction of any arteriole becomes so fixed and severe as to cause secondary capillary ischemia or anoxia, localized edema and hemorrhage appear in the adjacent retina. If the toxemia continues, this spastic constriction may become so generalized and severe as to produce diffuse retinitis of albuminuric type, the classic "retinitis of pregnancy nephritis." The presence or absence, or the advancement, of the involvement of the arterioles can be determined best by frequent systematic examinations of the retina.

Wagener's description of the retinal changes in cases of pre-eclamptic toxemia may be divided into four consecutive stages, dependent on the severity and duration of the hypertension accompanying the toxemia: (1) The first visible sign is spastic narrowing of the arterioles of the retina, which may affect all branches of the central artery. (2) Often there is irregular constriction of the lumen of the arterioles, usually first more marked in the smaller nasal branches; this constriction may vary in degree or situation from day to day. (3) Later, as the narrowing and constriction become more fixed, individual cotton-wool patches and hemorrhagic areas may appear in the retina. (4) Diffuse retinitis of albuminuric type may develop.

Ophthalmoscopic examination of the retina was made in 108 cases, in ninety-eight of which there were no convulsions and in ten of which there were convulsions associated with the acute toxic hypertensive syndrome of pregnancy, commonly called pre-eclamptic toxemia and eclampsia. During hospitalization of all patients but one, the systolic blood pressure was recorded at 140 mm. of mercury or more, and urinalysis revealed albumin grade 2 or more. In one case the highest blood pressure was less than 140 mm. systolic. Judged by the highest systolic blood pressure, the patients were classified in groups similar to those used by Peckham in his study of nephritis following acute toxemia; namely, group 1 included patients whose systolic blood pressure was between 140 and 169 mm. of mercury; group 2, those whose systolic blood pressure was between 170 and 199 mm.; and group 3, those whose systolic blood pressure was 200 mm. or higher.

Using the grading of 1 to 4, according to Wagener's description of the changes in the retinal arterioles and the retina proper in the toxemias of late pregnancy arranged according to the highest systolic blood pressure, it is shown in Tables I and II and in Figure 1, that the severity of the changes demonstrated in the retina increased progressively with the height of the blood pressure. In group 1, only 12 per cent of the cases were graded as high as 2 or 3, and none was graded 4; in group 2, 48 per cent were graded 2, 3 or 4; and in group 3, 87.5 per cent were graded 3 and 4. One patient whose systolic blood pressure did not reach 140 mm., four whose systolic pressure remained under 150 mm., and ten others who had pressures remaining un-

der 160 mm., had spastic retinal arteriolar changes. This is evidence that a generalized vascular disturbance rather than a local condition, such as lowered renal function, is present in association with the mild as well as the more severe forms of pre-eclamptic toxemia. In cases in which the systolic blood pressure was less than 180, no changes of acute retinitis grade 4 developed.

It may be assumed that there is an angiospastic change in the systemic arterioles similar to that which may be seen in the retinal vessels. If the spastic constriction is mild and of short duration, the arteriole will probably return to normal. If the spastic contraction is more marked and is maintained over a significant period of time, actual organic changes are prone to occur. This may affect vessels in one part or organ of the body more than another, and permanent damage may be done to the general vascular system or to the vessels of the brain or the heart or the glomerular tufts, which may fail to recover completely.

With this in mind, it is to be noted that the routine, regular, sometimes daily, retinal examination of patients with the acute vascular syndrome of pregnancy is of practical value. As shown in Table IV, labor was induced in forty-seven cases; the percentage of induction showed a rise parallel to both the rise in systolic blood pressure and to the severity of the retinal changes. In addition to readings of blood pressure, urinalysis and evaluation of the symptoms, changes observed in the arterioles of the retina furnish a valuable index of the degree of injury to the general vascular system and the rate at which this injury is progressing. In a number of cases the change in the retina is the deciding factor in determining if, and when, to terminate pregnancy.

In 72 per cent of 108 cases in which the systolic blood pressure was 140 mm. of mercury or more, positive evidence was found of more or less change in the retinal arteries or in the retina proper. As a rule, changes in the retina which at first consisted of spastic narrowing of the retinal arteries, revealed a definite increase in degree and severity, with the increase in the height of the systolic blood pressure and the duration of the toxemia. The first appearance of cotton-wool exudates and hemorrhages in the retina indicates the danger of permanent arteriolar injury; in the presence of such retinal changes, pregnancy should be terminated promptly.

Discussion

DR. W. H. CONBIT (Minneapolis): I thoroughly enjoyed this paper and wish to commend Dr. Mussey on this excellent survey. It recalls to memory a report before this Academy by Dr. William Murray, several years before his death, on the study of a series of patients with retinal changes in pregnancy. His series did not deal solely with patients in some degree of toxemia, but a group taken at random, including so-called normal pregnancies, if there is such an "animal." He found that practically every patient sometime during her pregnancy had some retinal changes that might to a greater or lesser degree affect her vision; but he left the impression with me that, even though my patients

come in complaining of headache or slight disturbance of vision, I should have no great concern or make any change in their lenses if they are wearing glasses, in order to protect them or increase their comfort through that particular pregnancy; that Nature is very kind and sooner or later would restore the vision to normal after delivery.

So little is known of the cause of the various toxemias of pregnancy that we cannot feel disappointed that Dr. Mussey did not discuss the etiology of these retinal changes. Every pregnant woman changes in her physiologic chemistry to a greater or lesser extent. I am reminded of one patient I had who was in her first pregnancy. Within the first month of pregnancy her urine showed positive albumin. She had a history of a very severe scarlet fever in years past but had had no recent urinalyses, so I had no idea of the kidney function at the time of her marriage. She was an obstinate creature and would pay no attention to her diet. The albumin increased and her blood pressure began to rise. When it reached 200 systolic and her vision was practically gone, I felt that the uterus should be emptied. After consulting with her husband and parents they consented to induction of labor at seven months. At that time she was totally blind. She recovered and in about six months her vision was restored.

After that I was at Lying-In Hospital taking work with Dr. Markou. I told him about this patient and asked him when he thought it would be safe for her to conceive again. He said, at any time after her kidney repairs and blood pressure and vision returned to normal. He remarked that it might have been a beef-steak or some specific food—in other words, a food allergy—that threw her off balance and started her in the toxic state. Afterward I delivered her of a boy and a girl two years apart. She escaped any untoward complications with both and had no hypertension or toxemic manifestations in either of these pregnancies.

DR. R. T. LAVAKE (Minneapolis): This is a most interesting and stimulating paper. Nothing can be added from the standpoint of pathologic changes in the retina but one may in discussion emphasize again the importance of watching for this retinal pathologic change as soon as we have the slightest suspicion of a beginning toxemia. This paper tends to strengthen the feeling of many of us that the advocates of non-intervention fail to consider the possible permanent damage to the mother even though one may be successful in saving the lives of mother and child. The case Dr. Condit mentioned redounds to the credit of his good judgment. He terminated pregnancy. Had he allowed the pregnancy to go on, as would the advocates of the non-intervention school, he might have lost mother and baby; or, instead of returning to normal, the mother might have been permanently damaged. I cannot help but feel that the advice given him regarding her future safety, though borne out by success in this instance, was over-optimistic. It has been my experience that patients showing retinal changes must be most carefully watched and checked before being advised that it is safe to become pregnant again.

Eye ground examinations at times furnish a clear indication for the advisable termination of pregnancy where blood pressure and urine indications are still not compelling. On the other hand, many of the worst cases of eclamptogenic toxemia show few if any eye ground changes, and this fact has led some men to minimize the importance of ophthalmoscopic examinations.

I would like to ask Dr. Mussey a question. Do you understand correctly that he considers retinal changes grades 1 and 2 are not in themselves an absolute indication for the termination of pregnancy, but that types 3 and 4 are absolute indications? Such a judgment would correspond to my experience.

DR. MUSSEY (closing): I wish to thank Dr. Condit and Dr. LaVake for their generous remarks. I think Dr. Condit is quite right in calling attention to the visual changes that a lot of pregnant women have. We were concerned here with the ophthalmic examination of toxemic patients. As far as etiology is concerned nobody knows much about the toxic factor. Ophthalmologists who have more knowledge than I have about it, feel that the spastic constriction of the arteriole, if it lasts long enough, will produce ischemia and edema and hemorrhages in the retina and may proceed to retinitis; this spastic constriction may be the etiologic factor producing the changes in the retina.

We feel that changes in the retina are merely an index of what is taking place in the arterioles throughout the body and, if there are changes in the arterioles of the retina, there may also be similar changes and hemorrhages in other organs. We have had such patients as the one whose case Dr. Condit reports. I recall several years ago a young woman who had complete loss of vision due to edema and separation of the retina. Following delivery, vision returned to normal and she had two subsequent normal pregnancies. If patients have systolic blood pressures of 200 or more and the pressure remains greater than 200, in the large majority of instances arterial damage will be produced; if not to the kidney or the eye, to arterioles somewhere in the body.

In regard to Dr. LaVake's discussion about routine eye examinations, we find that the ophthalmoscopic examination is of definite value in the hypertensive toxemias of pregnancy. We do not feel that induction of labor is often indicated for the patient who has a grade 1 or 2 change in the retinal arteries because she has not yet begun to have cotton-wool exudates or retinal hemorrhages. If the blood pressure is extremely high or if the symptoms are severe, labor may be induced even when there are no ocular changes; but, in the presence of ocular changes, even with a lower blood pressure, we have learned that frequent examinations by the ophthalmologist may reveal hemorrhages in the retina. When retinal hemorrhages appear, one cannot say they have not occurred elsewhere in the body. For this reason, when the retinal lesions are advancing, or if retinal changes are reached up to grade 3 or 4, even if the blood pressure is no higher we proceed with measures to terminate the pregnancy.

PNEUMATIC RUPTURE OF THE BOWEL

ARTHUR W. IDE, M.D.

Saint Paul

In 1904 W. G. Stone of London reported the first case of pneumatic rupture of the intestines. Since that time, probably due to the fact that compressed air is being used more extensively, there have been more of these injuries reported. There have been forty-four of these cases reported in the literature up to date. This indicates the rarity of this accident. During the last three years, so far as is known, there has been none of these accidents, probably because of instruction of the danger and because of "safety first" agitation.

There have been three papers written besides several reports of cases. The first work on this subject was done by Dr. Willis Andrews. He reported one case of his own and collected other unpublished cases. The second paper appeared in 1914 by Bendixon and Blything. They reported one case of their own and collected even other unpublished cases. Burt, in 1931, reviewed this subject and brought the number of cases up to that date. He reported one case of his own and referred to three other unpublished cases. Burt also listed all the published cases. This brought the total number to forty-four. Burt and Andrews did a considerable amount of work to ascertain the amount of pressure necessary to cause this injury. They experimented on bowel removed from animals and from cadavers.

This communication of ours reports one case of our own and adds twenty-four other unpublished cases to the forty-four cases that have already been published. This brings the total number to sixty-eight.

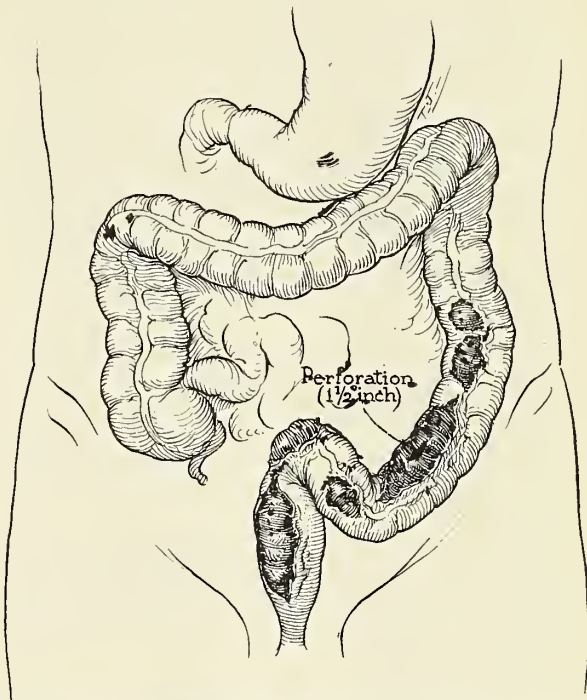
Our case of pneumatic rupture of the bowel came under observation on September 11, 1930. The victim was a car repairer employed by the Northern Pacific Railway. He was admitted to the hospital by ambulance at noon on September 11, 1930. The patient stated that he had a sudden attack of abdominal cramps which came on while at work one hour earlier. His past history was normal. He had never had gastro-intestinal disturbances of any kind. While x-ray pictures were being taken, the patient reluctantly admitted that earlier in the day he had turned the compressed air on a fellow workman and that at the time of the accident the fellow workman had retaliated by placing the nozzle of the hose near the patient's anus and released the air. This caused the severe cramps and, as the patient stated, "It filled me up with air." The cramps were soon followed by vomiting and urinary urgency.

The patient presented a picture of a serious abdominal condition. His pain was intense. His face was pale and gave an anxious pinched expression. The abdomen was markedly distended and tympanitic. There was diffuse tenderness and board-like rigidity. His pulse and respiration were rapid. His white blood count was 10,600. A roentgenogram showed free gas under the diaphragm.

A diagnosis of pneumatic rupture of the bowel was made, and immediate operation advised.

The patient was operated on three hours after the accident, under spinal anesthesia. The incision was along the outer border of the left rectus muscle. When the peritoneum was opened, gas escaped. The sigmoid was found perforated at about its midpoint. In addition, there were extensive lacerations of the serous coat of the sigmoid and the descending colon. The

damaged bowel was repaired. The peritoneal cavity was cleaned out as well as possible. Two flat rubber drains extended into the pelvis.



Perforation of sigmoid with extensive laceration extending well up on the descending colon.

My first group of cases consists of four which occurred accidentally. All four patients died. Two of them were operated upon.

Case 1.—With some other companions, L. F., aged twelve, was playing in the car shops of a railroad. They had been running and playing, and this boy got tired and sat down on the end of a pipe that was sticking out of the ground. One of the other boys, age about twelve years, kicked open the valve on the pipe. The pipe was connected with the compressed air apparatus and when the valve was kicked open the child was blown off. The end of the pipe was over the anus. The compressed air was introduced into the rectum and bowel. He was taken at once to the hospital, where an emergency operation was performed, but he died the following afternoon. The rectum, sigmoid, and a portion of the descending colon were badly torn and ruptured.

Case 2.—A machinist while at work was leaning over to adjust a nut. His fellow workman went behind him with an air hose and the nozzle came in contact with the patient's rectum. The patient immediately became violently sick. He was removed to a hospital and was operated on at once. A tear was found in the lower end of the sigmoid about 2.5 inches long. The sigmoid above this tear was contused and the outer coat of the bowel was bruised. The patient died the following day.

Case 3.—This patient was a machinist in the employ of a railway company. This is another case where the air hose in the hands of a fellow employee came near the victim's anus and the air was forced into the rectum under pressure. He sustained a rupture of the bowel and died. No operation was performed.

Case 4.—On February 1, 1920, a blacksmith helper, C. R., an employee of a railway company, was fatally injured when an employee accidentally put the nozzle of the air hose against the victim's rectum. The pa-

tient sustained a perforation of the bowel. In this case the patient died two days after the accident.

The second group of five cases occurred during the act of one man dusting another off with the use of the compressed air hose. Four of them died and one lived. Two of them were not operated upon.

Case 5.—On Oct. 29, 1918, a boy sixteen years of age was working in a railroad shop together with other employees. He was cleaning up after a day's work and they were using compressed air to blow the dust off their clothing. The boy asked a negro to blow the dust off his clothing. The negro then applied the nozzle of the hose between the boy's legs, and the air penetrated the colon. He was taken immediately to the hospital but died shortly afterward. There is no record as to whether or not an operation was performed.

Case 6.—(Dr. John R. Nilsson has furnished me with the following case.) G. D. was injured on May 30, 1926, when fellow employees were dusting off their clothing with compressed air. The nozzle of the hose was pointed at the victim's anus. He suffered cramps and distention. He was treated in the hospital, where he died six days after injury. There was no operation and no autopsy.

Case 7.—This patient was a machinist helper, aged twenty-one, and was injured on June 1, 1914. A fellow employee was brushing him off with an air hose. The nozzle of the hose was placed near the anus and the air was forced into his rectum, causing a rupture of the bowel. The patient was operated upon but died the following day.

Case 8.—A boilermaker in the employ of a railway company was blowing the dust off the coat of a fellow workman at the latter's request. In doing this the nozzle of the air hose was placed near the rectum while the victim was bent over. The injured man sustained a perforation of the bowel and died shortly afterward from shock.

Case 9.—On July 15, 1929, H. W., a railway employee, was injured when the nozzle of an air hose was directed against the anus by a fellow employee when he was dusting him off. The resulting injuries, due to forcing compressed air into the rectum, were not of a serious nature. The patient returned to work ten days after the accident.

The third group of thirteen cases occurred as an example of pranks or "horse-play." Three of these lived and ten died.

Case 10.—(This case was reported in the Bulletin of the Moses Taylor Hospital, Scranton, Pennsylvania. It occurred in the service of Dr. J. M. Wainwright, to whom I am indebted.) The report reads as follows: "The patient, an oiler in a car shop, was climbing up a ladder. A second workman held the nozzle of an air hose against his anus and turned on the air pressure. The air hose nozzle was three-eighths of an inch in diameter and had about ninety pounds of pressure back of it. He does not remember whether the nozzle was pressed against him, but thinks in having his thigh flexed on the ladder the air was able to enter more easily. He was wearing overalls, trousers and underwear, with no holes in any of them. He felt a sudden severe pain immediately when the air was turned on, and he says he could feel the air filling up his abdomen. His fellow workmen walked him about, hoping to remove some gas, and then put him in an automobile and gave him a ride as their first treatment had not been a great success. He was seen two hours after the injury. The abdomen was unusually hard, much harder than in the average case of peritonitis. Owing to failure to appreciate the possibilities, the patient was given a turpentine enema. An operation was done six hours

after the injury. When the peritoneum was opened there was a loud escape of gas under high pressure almost as loud as the report of a small automobile tire. The patient was given appropriate treatment and recovered."

Case 11.—This patient was a car cleaner. While bending over to see if the car windows were closed, a fellow employee stuck the nozzle of an air hose near his anus. He was taken to the hospital immediately after the injury and was operated upon. Lacerations were found around his rectum and emphysema of the entire abdominal wall and side. A rupture of the colon and sigmoid was found. The patient made a good recovery.

Case 12.—This employee was engaged in pressing grease into cakes and was working in a stooped-over position when a fellow employee held the nozzle of a compressed air hose at or near the anus. Immediately the patient was seized with pain in the abdomen and fell to the floor. Air was aspirated from the abdomen. He died five hours after the accident. No operation was performed.

Case 13.—In this case a fireman on a locomotive placed an air hose against the anus of the engineer. The engineer was leaning out of the cab window looking ahead. There was a rip in the engineer's trousers, and the force of the air pressure literally blew this man up like a balloon. The patient lived about twenty-four hours and then died. There was no operation.

Case 14.—This patient was another railway employee. An air hose was held near the victim's anus and a rupture of the bowel was sustained. The patient died shortly afterward.

Case 15.—On May 30, 1936, an engine watchman sustained a rupture of the bowel due to compressed air. The accident occurred as the result of horse-play. The injured man died. There is no further record.

Case 16.—Mr. P., a mechanic in the employ of a motor truck company, was killed by an air hose accident. This was another case of horse play, and the accident occurred in the same manner as the preceding case.

Case 17.—This man, A. L., was fatally injured in the same way as practically all of these victims. A fellow employee applied the nozzle of an air hose against his rectum, with resultant rupture of the colon. The patient died from shock and peritonitis.

Case 18.—On March 24, 1915, a railway employee was injured as a result of horse-play with compressed air. The compressed air entered the rectum and ruptured the walls of the rectum. The victim died three hours after the accident.

Case 19.—On June 21, 1915, J. H., an employee of a foundry company, was fatally injured when during horse-play a fellow workman applied an air hose to his rectum.

Case 20.—On June 15, 1920, a foreman, as a practical joke, applied the nozzle of an air hose to the anus of one of his employees. The victim sustained a perforation of the colon from which he died eight days later. There is no record of operation.

Case 21.—On July 31, 1936, a car repairer received injuries to his intestines while a fellow employee held an air hose against the anus with 90 pounds of pressure. As in practically all these cases, there was marked distention of the abdomen with severe pain and extreme shock. This man was operated on, and died during the operation.

Case 22.—An employee was injured by compressed air entering the anus. The injuries were minor and no disability resulted.

The fourth group consists of three cases which are not given in detail. These patients all died.

Case 23.—This case occurred in the plant of a cereal

company. No details are available, but the result was fatal.

Case 24.—This is a case of rupture of the sigmoid due to the application of compressed air. The accident occurred in Atlanta, Georgia. No details are available.

Case 25.—A fatal injury occurred to an employee of a railway finishing material company. No details available.

We made some effort to investigate the experience of oil companies at their filling stations. One officer writes, "I have recently heard indirectly of a small boy who suffered this accident as the result of a practical joke with an air hose at a filling station with a fatal result. I do not know the details of this case or how I can find them out."

We have a personal letter from the law department of one of our largest gasoline retail companies on this matter. They say they have never heard of such an accident. Probably the construction of the air nozzle at these filling stations is a great protection. However, undoubtedly these accidents have occurred at filling stations.

Compressed air is used extensively in industrial work for the purpose of transmitting power to drills, riveters, and other machinery. It is also used for cleaning the debris from inaccessible places as well as for paint spraying and sand blasting. The compressed air, under pressure of from 40 to 125 pounds, is piped to numerous places in industrial plants. The average person seems to have no comprehension of the danger of this force. It does not occur to them that there is any risk in directing this column of air against the body of another person. There appears to be some psychologic force that impels these men to direct this column of air at a vulnerable part of the body, namely the anus. Out of twenty-five cases, thirteen were definitely due to horse-play.

These victims were all fully clothed and the compressed air was forced through the clothing and into the rectum even though the nozzle of the hose was in some cases several inches from the anus. This is accounted for by various writers in two ways. In the first place, air under pressure from 100 to 125 pounds issuing from a hose, forms a solid column of air which acts as a solid body forcing open the sphincter muscles. In the second place, anatomic arrangements of the perineum are such that it acts much like a funnel in concentrating the air column at the anus. We might add that air under heavy pressure easily penetrated the smaller openings in clothing. The clothing does not seem to act as an obstruction in the column of air.

The column of compressed air emerging from the hose in these injuries finds the anal sphincter the point of least resistance and does very little damage on the outside. The real pathologic change is inside and concealed. For this reason, without an accurate history, most cases are considered as possible acute perforations from an ulcer or severe "colic" due to some other cause. It is interesting to note that a large number of these patients have been given an enema very early after admission. Marked distention of the peritoneal cavity with air is a characteristic feature of these cases. The presence of air can, of course, be demonstrated with x-ray.

In every case reported, the colon has been the viscus which has been torn or perforated. The sigmoid is in most cases the point of election for complete perforation. Usually there has been only one complete perforation of the colon with multiple tears of the outer coat of the bowel with bulging of the mucous coat. The reason for this perforation of the sigmoid, as Andrews has pointed out, is probably because the sigmoid flexure offers an added resistance to the air passing through the rest of the colon, and thus yields first to the unequal pressure. In most cases reported, the site of perforation and laceration is at the longitudinal band.

In this series of twenty-six unpublished cases, eighteen were fatal, five recovered, and in two cases we were unable to ascertain whether or not the patient had recovered. This is a high mortality rate and corresponds to Dr. Andrews' figures of 81.2 per cent.

As far as we could determine definitely, seven of the patients here reported were operated upon. Only five of the entire number of patients reported recovered. This would indicate that immediate operation is rewarded with favorable results and would markedly lower the mortality percentage.

The treatment of pneumatic rupture of the bowel is immediate laparotomy with repair of the lacerated bowel with drainage. In nearly every case reported, the rupture and laceration takes place in the sigmoid so that very little time need be wasted in exploration. For the same reason, the best approach is through the left rectus incision. In cases with enormous distention, resulting shock, and depression due to pressure, a needle may be inserted into the peritoneal cavity to gradually decrease the pneumatic pressure and relieve the patient to such an extent that operation may be successfully performed.

Conclusions

1. Clothing offers little resistance to air under pressure.
2. Rupture of the bowel is usually in the sigmoid with laceration of the outer coat of the colon.
3. Victims of this accident are apt to attempt to conceal the cause and thereby mislead the surgeon unless he bears in mind the possibility of pneumatic perforation.
4. Gradual release of intraperitoneal air pressure by means of inserting a hollow needle into the peritoneal cavity may be used to advantage to relieve shock and improve the patient as an operative risk. This may also be used as a diagnostic procedure.
5. Prompt diagnosis and early laparotomy offer the only chance of saving life in injuries of this nature.
6. The increasing use of compressed air in industrial work and its misuse by employees has increased serious and fatal accidents.
7. Strict rules covering the use of compressed air are in general use. Employees are promptly disciplined for any breach of these rules.
8. These are all potential claims. As far as we know, there has been no criminal action in connection with them.

Discussion

DR. H. P. RITCHIE (Saint Paul): I might add a case to this group. The story is the same as those recited by Dr. Ide. A workman in a shop was bending over and another man placed an air-hose near the anus. The man immediately dropped over, but recovered sufficiently to be taken home. There he was given a soap-suds enema which did not return. Another enema with a liberal quantity of turpentine was given and, when this did not return, a doctor was called to the home, and, appreciating the situation, sent the man to St. Luke's hospital. He came into the hospital about six hours after the injury with the most remarkable abdominal distention I think I have ever seen. At operation both enemas were recovered. It was quite an experience to open that abdomen and be almost overcome with the odor of turpentine. A slit was found in the sigmoid which was closed, the abdomen drained and the man recovered.

The cases of compressed air injury to the bowel are in the same class as any other case of traumatic rupture. The peritoneum stands all kinds of insult with recovery providing the irritation is not present too long. The time element between injury and treatment is the most important factor in recovery.

DR. IDE (closing): The workers in these shops are pretty well protected. Supervisors are very strict and do not allow any play or joking because, if they do, the men get into trouble. Any man playing around with any machine would be disciplined very severely.

The meeting adjourned.

R. T. LAVAKE, M.D.,
Secretary.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

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ABORTION—SPONTANEOUS AND INDUCED. Medical and Social Aspects. Frederick J. Taussig, M.D., F.A.C.S. Professor of Clinical Obstetrics and Clinical Gynecology, Washington University School of Medicine, Saint Louis. 536 pages. Illus. Price, cloth, \$7.50. St. Louis: C. V. Mosby Co., 1936.

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EXAMINATION OF THE PATIENT AND SYMPTOMATIC DIAGNOSIS. Second Edition. John Watts Murray, M.D. 1219 pages. Illus. Price, cloth, \$10.00. St. Louis: C. V. Mosby & Co., 1936.

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SYNOPSIS OF CLINICAL LABORATORY METHODS. W. E. Bray, B.A., M.D. Professor of Clinical Pathology, University of Virginia; Director of Clinical Laboratories, University of Virginia Hospital. 324 pages. Illus. Price, flexible binding, \$3.75. St. Louis: C. V. Mosby & Co., 1936.

AN INDEX OF DIFFERENTIAL DIAGNOSIS OF MAIN SYMPTOMS. Fifth Edition. Edited by Herbert French C.V.O., C.B.E., M.A., M.D. (Oxon.), F.R.C.I. (Lond.). Consulting Physician to Guy's Hospital; late physician to H. M. Household. 1145 pages. Illus. Price, cloth, \$16.00. Baltimore: Wm. Wood & Co. 1936.

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CONVALESCENT CARE IN GREAT BRITAIN. Social Service Monographs No. 34. Elizabeth Greene Gardiner, Assistant Professor and Supervisor of Medical Social Work, University of Minnesota. 163 pages. Price, cloth, \$1.50. Chicago: University of Chicago Press, 1935.

DISEASE AND DESTINY. Ralph H. Major, M.D. 338 pages. Illus. \$3.50. New York: Appleton Century Co., 1936.

A highly favored, though seemingly futile practice indulged in by medical historians is that of surmising the course of world events, had not some particular disease or pestilence exerted its influence. In "Disease and Destiny," Ralph H. Major occasionally wanders into the devious realms of second guessing, inevitably with rather fanciful conjectures. For the most part however, he is content to elucidate only on the direct and unquestionable influence of various diseases upon the course of history, geography, religion, philosophy, and the progress of civilization.

Although in recent years there has been no dearth of books on this same subject, "Disease and Destiny" has a particular charm that makes it rather distinctive. The author has interspersed throughout his book many anecdotes of relatively unimportant events and persons. These are not only intensely interesting purely as stories, but they give a more human and intimate insight into the influence of disease on what our New Deal phraseology might term "the forgotten man" of history.

Of the various diseases discussed, the chapters on syphilis and on the bubonic plague are most engaging. Readers will find this book entertainingly informative.

CHARLES L. STEINBERG, M.D.

EXAMINATION OF THE PATIENTS AND SYMPTOMATIC DIAGNOSIS. John Watts Murray, M.D., 2nd Edition. 1219 pages. Illus. Price, \$10.00. St. Louis: C. V. Mosby Co., 1936.

This is a book of 1219 pages which has gone into a second edition. In his preface the author stresses the indubitable necessity for the taking of a detailed history; he states that he does not claim to present any new facts but to present a large number of old established facts in condensed and helpful form. The subject matter has been gathered from the standard works most widely used in medical schools, various journals and results obtained by experienced medical men. The book is copiously illustrated, largely by reprints from other works. It is well printed and arranged. There is an ample index.

TREATMENT OF THE OVERFLOW INCONTINENCE OF NEUROGENIC VESICAL DYSFUNCTION*

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When one considers the lesions of the nervous system which disturb bladder function, he must be struck at once by the fact that one feature is common to nearly all of them, that is, impairment or destruction of sensation. This predominance of sensory lesions of the bladder is obviously due chiefly to the rarity of diseases which affect only motor centers and tracts, but also to the fact that pure motor disturbances of the nervous system rarely affect the function of the bladder.

The Innervation of the Bladder²

It is generally conceded that at least one, and possibly two, centers for micturition³ exist in the brain, probably in the frontal lobe, and that the motor fibers to the bladder lie in or about the pyramidal tracts, while the sensory fibers course chiefly in the posterior columns. It remains to be determined accurately whether there are any true urinary centers in the lumbar or sacral segments of the spinal cord. This question has not been settled because of the presence, in the wall of the bladder itself, of a center for emptying the vesicus. This center may involve the ganglia of the vesical plexus (Fig. 1) or it may be simply a question of that inherent irritability of unstriated muscle which leads it to contract when sufficiently stretched.

It is generally agreed that motor fibers reach the detrusor and most of its sensory fibers leave via the pelvic nerve (n. erigens), the components of which enter and leave the spinal cord by the upper two or three sacral segments. The

rôle of this nerve in controlling the internal sphincter is not settled, although it is usually held that its stimulation relaxes the sphincter. It seems more probable that closure is maintained by its normal tone, and that it is pulled open by the trigonal muscle. The sensory portion carries common sensation (sense of fullness, desire to void).

The hypogastric nerve (presacral nerve or plexus) is said to produce relaxation of the detrusor and contraction of the internal sphincter when stimulated, although this view has recently been questioned.⁴ It contains sensory fibers which carry the sensation of overdistention of the bladder (strangury). Its components enter and leave the upper lumbar and lower thoracic segments of the cord.

The pudic nerve is undoubtedly motor to the external sphincter (voluntary retention of urine) and sensory to the urethra, and connects with the upper sacral segments.

The Nervous Control of Micturition

The nervous mechanism of urination is not wholly settled. It is certain that contraction of the detrusor is initiated by a rise in the intravesical pressure, which itself stimulates the detrusor to more powerful contraction. Whether this can be brought about by the direct influence of a cerebral center upon an unstriated muscle such as the detrusor is doubtful. Most probably it is usually effected by the simple accumulation of urine, leakage being prevented in the interim by the normal tone of the sphincters. Accumulation of urine having raised the intravesical tension, contractions of the detrusor and trigone ensue while the desire to void is transmitted to the cerebral cortical center, which in turn relaxes

*From the Urological Division of the Department of Surgery, the Medical School, Minneapolis. Presented at the meeting of the North Central Branch of the American Urological Association at Rochester, Minnesota, on November 2, 1935.

the external sphincter willfully. The trigonal muscle having pulled open the internal sphincter (Fig. 2) urine escapes.*

The hypogastric nerves may come into play when it is desired to inhibit detrusor contraction, but it may also be that, a prolonged contraction having met with the barrier of a voluntarily contracted external sphincter, the detrusor becomes fatigued and relaxes without the intervention of the nervous system. When one wishes to urinate without the intravesical pressure being high enough to initiate a contraction, the mechanism is the same except that the original rise in tension is brought about by contraction of the abdominal muscles.

Thus two facts complicate all theories of the nervous mechanism of micturition, namely, the probable existence of local muscular mechanisms for contracting and relaxing the detrusor without the intervention of the nervous system at all, and the uncertainty which prevails as to the exact rôle of the brain in urination. The nervous control of urination probably consists merely in superimposing upon the local mechanism a means of voluntary control of the external sphincter, and a means of increasing the intravesical tension voluntarily if indirectly by tightening the abdominal muscles.

It seems probable from this that disturbances of the sensory supply of the bladder should be more important than lesions of the motor pathways. However, in nearly every instance, the lesions in the nervous system itself are mixed in character because of the close proximity of motor and sensory tracts and pathways.

The Effect of Sensory Lesions

Abrupt complete loss of sensation leads to distention of the bladder and ultimately, through myogenic detrusor contractions (the external sphincter is relaxed by being cut off from the motor cortex, as is the anal sphincter during spinal anesthesia) overflow occurs. In the absence of the voluntary contraction of the abdominal wall which is required to maintain intravesical tension during normal micturition, the resultant bladder emptying is incomplete unless supplemented by manual pressure. This type of lesion is best exemplified by trauma to the spinal

cord and constitutes a special case which is not to be discussed here.

I am primarily concerned with those lesions which produce a gradual and usually incomplete loss of sensation. Such a condition is but rarely seen in disease of the brain because the lesions must be bilaterally symmetrical in order to produce them, and because lesions extensive enough to do so usually cloud the sensorium and so confuse the picture. These same facts have made accurate cortical localization of the various functions of the bladder difficult and unsatisfactory.

In the spinal cord, *tabes dorsalis* is the commonest of the lesions which disturb the vesical function, but similar disturbances also occur with multiple and subacute combined sclerosis, *syringomyelia*, in *spina bifida*, and as a late complication of infectious and traumatic myelitis. *Poliomyelitis*, predominately motor in character, does not commonly alter the vesical function.

The commonest disorder due to lesions of the peripheral nerves is that seen with occult sacral *spina bifida*. The pressure of the presenting part upon the pelvic nerves and vesical plexus during labor may have similar, although acute, effects, and the operative trauma or postoperative inflammatory reaction following posterior resection of the rectum may also reduce or destroy bladder sensation temporarily or, rarely, permanently.

With slowly progressive impairment of vesical sensation, the patient becomes less conscious of micturition, and voids infrequently. As a consequence, the bladder is usually overfull and its tension slightly elevated, sufficiently to cause some capillary stasis, reduced oxygenation of the detrusor and, ultimately, atrophy. A stage is now reached in which the bladder is no longer emptied, distension is more marked, and atrophy progresses. If the condition is not interrupted by treatment, overflow incontinence now develops, simply because sensory impairment is so advanced that the patient is unaware of the myogenic contractions of his bladder and does not call his external sphincter into action. In other words the bladder, while remaining active, becomes "unconscious."

Treatment

At any stage in a neurogenic vesical dysfunction due to sensory loss, two types of treatment are available, namely, methods of improving the

*While Young and Wesson hold that trigonal contraction is dependent on hypogastric stimulation, it is equally possible that simple stretching or compression of the trigone during vesical distention may have a similar effect without the intervention of the nervous system.

expulsive force of the detrusor, and education to compensate for loss of sensation. Methods of improving or restoring the expulsive force include the use of drugs which stimulate the con-

by refusing to allow him to urinate hastily. The importance of these measures can scarcely be overemphasized. Their employment absolutely requires an intelligent, coöperative patient.

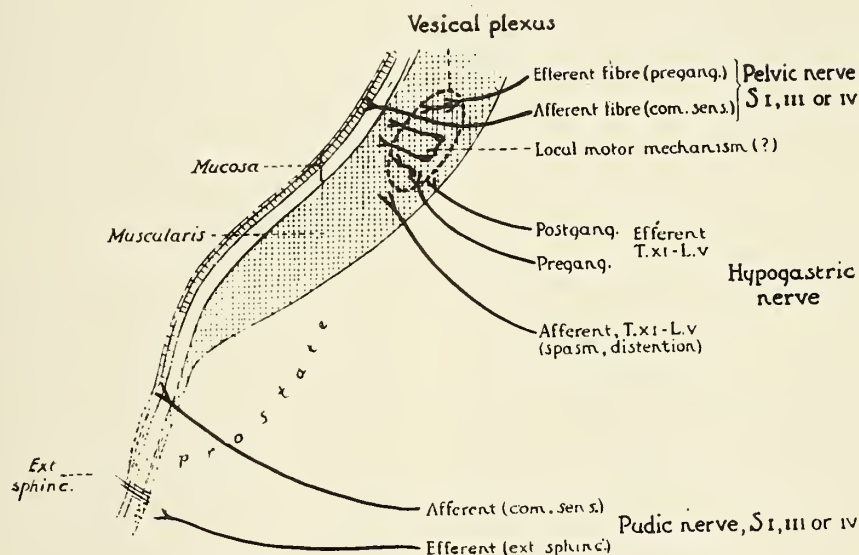


Fig. 1. Suggested local nervous mechanism for the expulsion of urine.

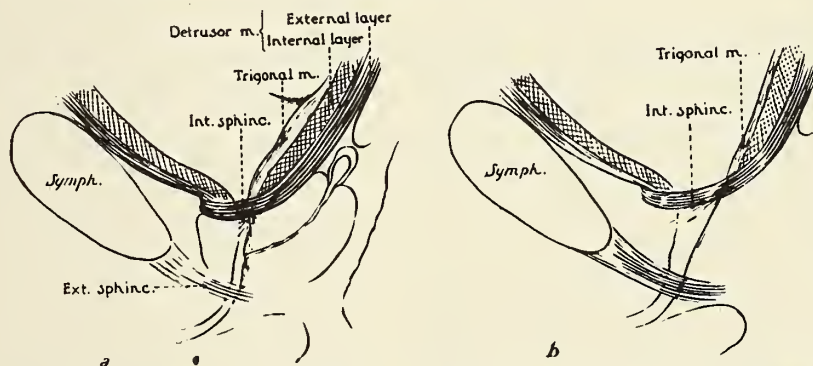


Fig. 2. The function of the vesical trigone (after Young and Wesson, Arch. Surg., 3:1-39, 1921).

traction of smooth muscle (eserine, pilocarpine, acetyl choline and especially its more stable derivatives); rest of the bladder by intermittent or continuous catheterization or by cystostomy; and the performance of presacral neurectomy.

Education consists in training the patient to micturate at regular intervals by the clock even in the absence of any conscious desire to do so; to assist micturition by assuming that position (often sitting) in which he himself finds it easiest to accomplish, and by massaging the bladder firmly and persistently during the act; and

The use of drugs and the catheter, coupled with training, may succeed in the early stages when retention alone is present, but when the stage of overflow is reached, more effective measures are usually required. An essential preliminary to therapy in these cases is to exclude the possibility of a complicating mechanical obstruction, remembering that a prostatic fibrosis or hypertrophy so slight in degree as to cause no symptoms below a normal bladder, may lead to retention or overflow if even mild neurogenic vesical dysfunction exists.

Case 1.—A. S., a man aged fifty-five, suffered a traumatic myelitis at the 12th thoracic segment with urinary retention and fecal incontinence. After a laminectomy in September, 1932, he made a good recovery except for an overflow incontinence of urine for which I first saw him in December, 1934. Cystoscopy having demonstrated an internal sphincter held open by prostatic fibrosis, as well as impairment of sensation and expulsive force, urethral dilatations with the Kollmann dilator were carried out at weekly intervals for eight weeks. In April, 1935, control was normal and the residual urine had disappeared.

Case 2.—G. C., a man aged fifty-eight, had had tabes dorsalis, bilateral Charcot ankle joints, and severe hypertension for years. Difficult urination had been noted for two years, and incontinence for one month. There were the usual signs of tabes dorsalis, a blood pressure of 205/120, a fibrous, contracted prostate, and 1,500 c.c. of cloudy residual urine. Sensation and expulsive force were much reduced, the internal sphincter was relaxed, and the bladder trabeculated. After two weeks of drainage with the inlying catheter and the administration of pilocarpine, the residual urine was unchanged. A transurethral resection was done, only 1.5 grams of tissue being removed. Thereafter the patient was taught to void every three hours during the day and twice at night. The residual urine never exceeded 100 and was usually 20 c.c. until his death from a cerebral hemorrhage six months later. Incontinence did not recur.

These are typical instances of the aggravation of neurogenic vesical dysfunction by mechanical obstruction so slight that it would not affect the function of a normal bladder at all.

In most instances, no obstructive lesion is present, and reliance has to be placed upon increasing expulsive force and education.

Case 3.—F. B., an Indian aged fifty-one, was seen in the Neurological Clinic in 1930 with typical tabes dorsalis, 150 c.c. of residual urine, and a mild overflow incontinence. He was given antiluetic therapy and bladder lavage by his home physician but grew slowly worse. In May, 1935, overflow was severe, there were 200 c.c. of infected residual urine, and cystoscopy showed a relaxed internal sphincter, much reduced sensation and expulsive force, trabeculation, and poor kidney function.

Cystostomy was done on May 11, 1935, and maintained until August 7, 1935, at which time the bladder capacity was 100 c.c., sensation fair, and expulsive force excellent. The cystostomy was allowed to close, he was given pilocarpine, and taught to void "by the clock." On August 15th, control was normal and the residual urine 20 c.c. The symptoms have not thus far recurred.

Case 4.—D. K., a boy of nine, had received energetic intraspinal therapy for meningococcal meningitis in June, 1934. He recovered except that he was incontinent of urine and feces, apparently due to trauma of

the cauda equina. On admission in September, 1934, he had saddle anesthesia, 200 c.c. of residual urine, and the cystoscopic findings of a neurogenic dysfunction. He had been catheterized three times daily since the onset of the trouble.

In the hope of recovery of the spinal cord, cystostomy was done on October 15, 1934, after bladder resection with an inlying catheter, and the administration of pilocarpine and B methyl acetyl choline to the point of tolerance had yielded no benefit. The cystostomy was closed after three months and the patient was taught to void every two hours and to massage the bladder area during urination. The residual urine was at first 200 c.c., but fell to between 0 and 50 c.c. during the administration of pilocarpine, and has remained so after its discontinuance.

However, enough incontinence remains to require the wearing of a urinal. While I suspect that the severity of the lesion (fecal incontinence, saddle anesthesia) is such that perfect control cannot be anticipated, the reduction of the residual urine has been of undoubted value so far as the future of his kidneys is concerned. He is being watched with a view to the performance of a sphincter plastic if the spinal cord does not recover. The possibility of a prostatic fibrosis which holds the urethra open (secondary to prolonged catheterization) must be excluded first.

An infectious process in the spinal cord may produce disturbances in the function of the bladder similar to those under discussion.

Case 5.—G. P., aged twenty-one, was normal until 1928 when he was suddenly seized with paralysis of the legs, anesthesia below the umbilicus, and incontinence of urine and feces. Recovery was progressive until, on admission in December, 1933, he was able to walk almost normally but had persistent urinary incontinence with 250 c.c. of residual urine. Cystoscopy showed a typical neurogenic dysfunction, and catheterization relieved the incontinence until 250 c.c. of urine had again accumulated in the bladder. The lower extremities were somewhat spastic, and there was hypesthesia of the skin below the umbilicus.

Presacral neurectomy was done after the method of Braasch and Learmonth⁴ on January 3, 1934, and was followed by complete retention. An indwelling catheter was used until, on the 25th day, the retention persisting, an acute epididymitis developed. Cystostomy was done, and maintained for six weeks. Upon closure of the suprapubic fistula, complete bladder emptying followed a single dose of Mecholine (Beta methyl acetyl choline) and, with "urination by the clock," has persisted to the present time. Incontinence has not recurred.

To my mind this case demonstrates that presacral neurectomy is to be regarded simply as one of the adjuvant measures for increasing the expulsive force and, while effective when damage to the bladder is mild, will fail if much atrophy of the detrusor has occurred.

Spina bifida, both occult and frank, is often associated with disturbed bladder function. The

mild forms are apparently due to an associated anomaly of the vesical plexus, since the only evidence of disorder is in the bladder. In the severe forms one finds perineal (saddle) anesthesia, sensory disturbances in the feet, and fecal incontinence, indicating that the spinal cord itself is the seat of an anomaly.

Case 6 illustrates the former situation.

Case 6.—G. K., aged fourteen, had always urinated frequently and had enuresis, but two years before admission had developed diurnal incontinence of urine. On admission on January 25, 1933, neurological examination was normal, but there was a palpable defect in the sacrum, the bladder was visibly distended, and urine escaped when light pressure was made upon it. The residual urine was 250 c.c. and cystoscopy disclosed a relaxed internal sphincter, poor sensation and expulsive force, and advanced trabeculation with cellule formation. Excretion urography demonstrated a moderate bilateral hydronephrosis. Use of an inlying catheter and drug therapy for six weeks having failed to produce benefit, a presacral neurectomy was done on March 16, 1933. Influenced by the damaged state of the bladder, I made a cystostomy at the same time. This was closed six weeks later, and "urination by the clock" instituted. The residual urine at discharge was 20 c.c.

In April, 1934, there was still a patch of granulation at the site of the cystostomy, incontinence occurred only if the patient forgot to micturate, and the residual urine was 15 c.c. Excision of the granulations was followed by healing. In September, 1935, the residual urine was 15 c.c. and there was no incontinence.

The effect of forgetting to urinate points clearly to the importance of urination at stated intervals in these cases, since no form of therapy can restore normal sensation. Neglect of this precaution will undoubtedly result in recurrence of the urinary disturbance.

The severe form of spina bifida is comparable in its effects to injury of the cauda equina as described in Case 4, and does not offer so good a prospect of cure by the measures here described.

Case 7.—H. S., a boy of eight, was operated upon at the age of eight days for a sacral spina bifida and meningocele. When first seen in September, 1934, he had never learned to urinate normally, and had always been partially incontinent of feces. Neurological examination disclosed hypesthesia of the perianal skin, the anal sphincters were lax, the residual urine was 100 c.c., and the usual cystoscopic findings were present.

Combined presacral neurectomy and cystostomy were

done on September 10, 1934. The cystostomy was closed six weeks later and, on November 18, the residual urine was 15 c.c. and incontinence of urine was absent.

In April, 1935, nocturnal incontinence had recurred, and examination disclosed a cicatricial posterior urethritis with the internal sphincter held open and no residual urine. Dilatations by the home physician having been fruitless, the patient was readmitted to the hospital in October and is now being treated with an inlying catheter, pilocarpine, and dilatations. I fear that his sensation is so defective that normal control can never be restored.

Summary and Conclusions

1. Most cases of neurogenic vesical dysfunction are due to sensory lesions.
2. Early in their course partial retention develops, and can often be relieved by bladder rest with the inlying catheter supplemented by drugs to increase the expulsive force, provided that the patient is then trained to urinate at regular intervals by the clock.
3. Later, the bladder wall is damaged by the distention so that some degree of atrophy occurs, and overflow incontinence (unconscious partial evacuation of the urine) follows.
4. In selected cases, six to twelve weeks rest of the bladder by cystostomy, followed by careful training, may give relief. The habit of "urination by the clock" must be maintained permanently if recurrence is to be avoided.
5. With more severe damage to the detrusor, cystostomy is best supplemented by presacral neurectomy, which should be regarded only as one means of increasing expulsive force.
6. If the lesion of the nervous system is advanced enough to produce fecal incontinence, the prospect of cure by these methods is poor, because sensation is insufficient to permit continuous voluntary contraction of the internal sphincter.

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RADIATION THERAPY*

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THE earliest attempts at x-ray therapy were reported within three months after Roentgen's discovery of the x-rays. The first experimental work was done on the theory that these x-rays of Roentgen might have bactericidal powers. In a period between 1896 to 1902 a decided controversy was waged over the bactericidal powers of the rays.

In 1902 Pusey and Caldwell,⁷ in their monograph "The Roentgen Rays in Therapeutics and Diagnosis," stated as follows: "The fact that organisms in living tissues can be destroyed by exposure to x-rays while the same organisms in inert cultures are uninfluenced by x-ray exposure proves positively that it is not the influence of the x-rays per se that causes the destruction, but that the tissues themselves, doubtless under the conditions of activity excited by x-rays, play the important role in the germicidal process."

The accuracy of this observation was shown clearly nearly twenty years later when Hickey, in Detroit, and Ledoux-Lebard, in Paris, simultaneously reported the cure of diphtheria carriers by x-ray treatment directed at the lymphoid tissue in the throat, which acted as the host for the bacilli.

The first record known of an attempt to treat cancer by x-rays comes from the records of E. H. Grubbe⁴ of Chicago, who treated a patient on January 29, 1896, for cancer of the breast. Grubbe was at that time suffering from a Roentgen dermatitis of his hands contracted in his experimental work. This inflammatory reaction on his hands led him to experiment on cancer with the possibility of a therapeutic effect resulting from producing a like inflammation.

These early experiments were done with static machines. Following this period induction coils of gradually increasing capacity were evolved and higher voltages and more current became available.

At this stage the only method of estimating dosage was based on fluoroscopic or photo-

graphic effects of the rays. Thus, each worker would be forced to work out his own technic, and owing to the lack of measuring instruments could not transmit his method to other workers.

It was not until 1902 that Holtzknecht⁵ invented his chromo-radiometer which was not unlike our present hemoglobinometer. Following this work of Holtzknecht, American physicists developed the spark gap for measuring voltage and the milliamperemeter for measuring current. These measurements in America rapidly superseded the more inaccurate methods, although European workers continued for many years to use the earlier methods of measurement.

The foundation for deep x-ray therapy was laid by Nicholas Senn⁹ of Chicago, when in 1903 he reported a favorable result in the treatment of leukemia. He reported that the size of the spleen was reduced and a reduction in the number of leukocytes took place.

Not until 1904 was any filter interposed between the patient and the x-ray tube.

Perthes⁶ in Germany used aluminum. He noted that Roentgen in his original observation stated that "all substances have respectively a selective absorbing power for the rays."

Aluminum was known not to interfere with the passage of "useful" or harder rays; he theorized that by that same token it might absorb the non-penetrating or soft rays. He found that not only would the skin tolerate larger dosages, but that the therapeutic effect in the deeper structures became more marked when the rays were filtered through aluminum.

Filtration now being established on a sound basis, the demand for larger sources of energy became insistent.

Clyde Snook¹⁰ of Philadelphia in 1906 developed the "interrupterless transformer." This invention placed at the command of Roentgen therapists a machine which functioned properly and gave a tremendous increase in the amount of radiation available. The fact that this original machine is still being employed at the University of Pennsylvania shows how well Snook visualized the needs of the future. His cross-

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arm type of rectification with the elimination of the unsatisfactory mercury interrupter was one of the two major advances in Roentgen therapy since Roentgen's discovery.

The second advance was made in 1913 when W. D. Coolidge² of the research department of the General Electric Company invented the hot cathode tube which bears his name. The development of this tube was the direct result of Dr. Coolidge having only a short time before invented a method of making the tungsten ductile.¹ Thus, in one discovery, Coolidge removed two of the greatest obstacles to human endeavor; the carbon filament electric light, and the unstable, fragile and inefficient gas x-ray tube.

It was my privilege and pleasure to use in x-ray therapy the first Coolidge tube manufactured.

These two scientists, Snook and Coolidge, have contributed more to Roentgen therapy than all of the combined work of other men since the time of Roentgen.

Following the development of a reliable source of energy and an x-ray tube capable of handling the energy, the next natural step was the development of an apparatus to measure the dosage delivered to varying depths of the human body. After various attempts by many men, both roentgenologists and physicists, both here and abroad, a satisfactory ionization chamber was developed in 1924. At first these instruments were used to calibrate x-ray machines. Now, in the most modern machines, they are built in as an integral part of the machine and constantly register the amount of radiation being delivered at various depths during the administration of the treatment. The further tremendous advantage is the safeguard, that if a filter or any part of a filter be omitted, this fact is immediately apparent on the electric iometer on the control board.

During this period of time, radium had been discovered and was becoming more and more popular as a source of therapeutic radiation. The similarity of the physical characteristics and biological effects of these two sources of energy had been noted, and the further fact that the two could be advantageously combined led to the combined roentgen-ray radium treatment.

The use of radium locally in localized cancer of the cervix of the uterus produced, and is still producing, many spectacular cures. The effects of radium employed locally is unfortunately

sharply localized to the area to which it is applied. Thus an enormous number of carcinomas which extended beyond the confines of the cervix could not be reached by radium.

This led to two developments: (1) the accumulation, where possible, of sufficient radium to construct a bomb for external radiation to supplement local applications of radium; (2) to x-ray manufacturers gradually developing larger machines and tubes of a larger capacity in an effort to approach radiation equal to the gamma rays of radium.

In 1921 a machine was developed which would produce 30 milliamperes of current at 200 kilovolts. A water cooled Coolidge tube capable of handling this amount of current was developed shortly thereafter.

With the advent of this machine and tube the results in the combined treatment of carcinoma of the cervix of the uterus made a marvelous advance. The amount of energy employed by this apparatus permitted still more of the softer or non-penetrating rays to be filtered out. Copper then came into use as the main filter, with a small amount of aluminum still being retained. This permitted larger dosages of radiation to reach deep seated tumors without permanent damage to the intervening structures.

Notable progress was made under 200 kilovolts in deep x-ray therapy especially when it could be combined with radium employed locally to the lesion. There still remained, however, a large group of deep seated tumors, where the local application of radium was impossible, where it was impossible to deliver a lethal cancer dose through the skin surfaces without doing irreparable damage to the skin. The few clinics who had enormous amounts of radium were able to treat this group of cases by the external application of the highly filtered radium. Those of us not so fortunate in the supply of radium merely retarded the rapidity of the growth, or treated the symptom-producing metastases as they occurred.

Two years ago the General Electric X-ray Corporation built three x-ray machines of pulsating current type capable of delivering 800 kilovolts and also constructed an oil cooled tube capable of handling this amount of energy.

One of these machines was placed at the University of California, one at the Memorial Hospital in New York City, and one with Dr. Henry

Schmitz at the Mercy Hospital in Chicago. Recently other manufacturers have produced similar machines.

Since its installation it has been my privilege to follow the cases treated by Dr. Schmitz with his machine. He has operated his machine at 400, 600 and 800 kilovolts. When he reached the 800 stage in certain control cases of early carcinoma of the cervix of the uterus he abolished the use of radium locally in the cervix. He feels that the immediate results have been fully as brilliant as in those cases in which radium has been used locally as well. He feels, however, that when voltages of below 800 kilovolts are used, radium locally should still be employed.

The logical conclusion from the above facts, which are as yet unpublished, but which I have been permitted to cite, is that the ultimate in necessary voltage has probably been reached.⁸

Treatment with these pulsating current machines is tedious as each increase in voltage must be met by a drop in milliamperage in order to stay within the capacity of the tube. To compensate for this fact the General Electric X-ray Corporation in the spring of this year produced a constant potential x-ray machine of 400 kilovolt capacity. The simplest example to illustrate the difference between the pulsating current and constant potential machine is the flow of water through a pipe connected directly with the pump, and the flow of water through a pipe connected with a gravity flow tank. The pump represents the pulsating current machine. The gravity tank represents the constant potential machine. On the constant potential machine there is an even flow of current with no variation as it is fed from the condensers directly to the x-ray tube. Consequently, the same amount of radiation can be delivered in the constant potential machine in 80 per cent of the time that it would take a pulsating current machine to deliver a like amount. While this may not sound like an appreciable saving it means that twenty-four patients can be treated with one machine while twenty are being treated with the other. Theoretically we should have a much longer tube life with the constant potential machine. This is a matter of considerable financial importance as the tubes have an average life of only three hundred hours on the pulsating current type of machine.

At the present time no one knows whether we will care to go to voltages higher than 400 kilovolts or not. Our experience at this voltage, while it has lasted only five months, is eminently satisfactory. Not until five years have elapsed can this question be definitely answered.

At the present we can say that with this amount of radiation we are noting rapid disappearance of tumors which were markedly resistant to treatment with the 200 kilovolts. We have also noted rapid sloughing of radiation-sensitive tumors from a too rapid application of this radiation. Perhaps a word about the comparative wave lengths of the different types of radiation would not be amiss. The available wave length of a 200 kilovolt machine is .19 Ångstrom units. The 400 kilovolt machine has a wave length of .045 Ångstrom units. Radium has a wave length of .0022 Ångstrom units. Consequently the 400 kilovolt x-ray machine produces a wave length between three and four times the wave length of radium. From a practical standpoint it would take radium valued at more than a million dollars to equal the output of a 400 kilovolt x-ray machine. Bearing this fact in mind it is obvious that in the future we must look to deep x-ray therapy rather than to radium in the treatment of all deep seated malignancies. Our problem in radiation therapy is to deliver to the tumor from four to eight times the dosage necessary to produce a surface erythema, without doing irreparable damage to the skin and other intervening structures. This is done by the fractional method devised by Coutard of the Curie Institute of Paris. Two or more portals of entry are used and treatment is administered each day. From eighteen to thirty days is necessary for the administration of a lethal cancer dose. The average period of treatment is twenty days.

If at the end of six weeks after the last treatment has been administered we are led to believe the tumor has not been thoroughly eradicated a second series of treatments is administered.

Three factors enter into the determination of whether a given tumor is amenable to radiation therapy or not: First, the pathological examination of material obtained by biopsy. As a general rule the more cellular the growth the more likelihood of favorable response. Second, the rapidity with which the tumor has developed. The more rapid the growth, the more likely a

rapid disappearance under therapy. Third, the type of epithelium from which the tumor arises. For example, most bladder tumors are very sensitive to radiation while most rectal tumors are highly resistant.

Tumors arising from lymphoid tissue are extremely sensitive to even low voltage therapy. Tumors arising from muscle and nerve tissue are the most resistant to radiation.

Tumors of certain areas which we have treated with 400 kilovolts and show immediate response may be of interest.

Carcinoma of the esophagus is generally responsive to radiation, but it is unwise to proceed rapidly as these growths are likely to slough rapidly with ensuing perforation. Tumors of the stomach generally respond. Here, too, we are faced with the possibility of a too rapid disappearance and a resulting perforation. Schmitz of Chicago prefers an exploratory laparotomy on all stomach carcinomas and does not radiate those where the involvement has spread to the serous coat.

Carcinoma of the large intestine above the rectum responds favorably. Carcinoma of the rectum is more resistant. We have obtained marked regression but as yet no complete disappearance of the local carcinoma.

Hypernephroma responds favorably. Bladder tumors are as a rule radiation-sensitive and disappear rapidly.

Carcinoma of the prostate, which in the past has shown little response to lower voltage, exhibits marked regression under the higher voltage therapy.

Carcinoma of the cervix of the uterus has always responded favorably to the combination radium and radiation therapy. It is responding much more favorably with higher voltage x-ray therapy which delivers a lethal cancer dose to the extensions of the growth from the cervix in regions which are beyond the reach of the radium placed locally in the cervix.

Inoperable carcinoma of the fundus of the uterus undergoes marked regression under deep x-ray therapy.

Perhaps the most gratifying results we have obtained with the high voltage has been in papillary cystadenoma of the ovary. Unless discovered extremely early these growths in the past have been uniformly and fairly rapidly fatal. From the scores we have treated in the past

twelve years with 200 kilovolt therapy we have obtained only two five-year cures. During the past five months we have treated eight such cases with advanced involvement. Two patients died during treatment. One patient is still under treatment and responding favorably. The remaining five patients are apparently well.

Carcinoma of the breast is still a debatable subject. This deep x-ray therapy has been employed too short a time to attempt to draw any conclusions as to its value in postoperative treatment. Most of the statistics on cure in carcinoma of the breast are based on the five-year period. We know that there is a large mortality between five and ten years, and an appreciable mortality even later.

The most comparable statistics as to the value of postoperative radiation in carcinoma of the breast come from two services in the Mercy Hospital in Chicago.⁸ One hundred and fifty cases on one service were operated upon and not radiated. One hundred and fifty cases on another service were operated upon and given a thorough course of radiation. At the end of the five years 18 per cent of the non-radiated cases were living. Of the radiated cases 35 per cent were living. This would indicate that there is some value in postoperative radiation in carcinoma of the breast. Whether these figures can be bettered or even equalled by treatment under higher voltage remains to be seen. Certainly these results are better than those I have obtained with similar treatment.

Tumors within the mouth, including those involving the base of the tongue, respond favorably to high voltage therapy. The reaction on the mucous membrane is marked and is attended by much discomfort, but always subsides.

Basal cell epithelioma can be completely eradicated by a cauterizing dose of nonfiltered low voltage x-ray therapy.

Carcinoma of the lip responds to a cauterizing dose of unfiltered low voltage x-ray therapy or to the localized application of radium. It responds equally well to surgical excision. Block dissection of the glands of the neck should be done regardless of the type of local treatment used. The technic followed at the University Hospital for the past several years yields excellent results: local application of radium to the growth, cross-firing of the glands of the neck with deep x-rays, followed by block dissection of

the glands of the neck several weeks later.

Carcinoma of the larynx responds favorably to cross-firing with deep x-rays.

Carcinoma of the bronchus has been held in abeyance for a period of years with x-ray treatment with a voltage of 200 kilovolts. We are in hopes that 400 kilovolt therapy may give even more favorable results. Since we have installed our 400 kilovolt machine we have not had an opportunity to treat any primary carcinoma of the bronchus which had not already metastasized.

Lymphosarcoma and Hodgkin's disease have in the past shown a very favorable response to x-ray treatment with the lower voltage. Unless a case proves refractory to doses of 200 kilovolts we will not resort to higher voltage therapy.

Menopausal bleeding and uterine fibroids are amenable to low voltage therapy and we have

not had to resort to higher voltage in their treatment.

Leukemias are best treated with low voltages as the response is likely to be too rapid with the higher voltage therapy.

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MORTALITY IN APPENDICITIS

A Study of Two Hundred and Twenty-nine Cases Taken from the Surgical Services of the Ancker Hospital

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DURING the past few years remarkable progress has been made in medicine and in this period some of the more common diseases, that were given consideration twenty-five years ago, have not received much individual attention. Appendicitis falls into this group. However, in the past few years several studies have shown that the mortality in appendicitis is much higher than most of us have realized.

Twenty-five years ago operations for appendicitis were very common. To be sure many appendices were removed without relief of symptoms and this undoubtedly caused a reaction among the laity, making them less appendicitis minded. The mortality rates recently reported have stirred up a new interest in this very common disease.

It was felt that an analysis of a group of cases treated by different surgeons would be of interest and therefore these cases were selected from the surgical service of the Ancker Hospital. They were treated during the five-year period from 1928 to 1932. There are no so-called

chronic or subacute cases included in this group. They are all pathologically proven cases of appendicitis from the acute ulcerative to the more complicated types.

We feel there is no necessity, as a rule, for emergency operations in a case with an appendiceal abscess. On first examination one may find a palpable mass but the signs of severe infection may be absent. This may not be an abscess but merely a mass made up of the appendix and adjacent indurated structures. With expectant treatment these masses often disappear and recovery ensues, but the patient should return at a later date (three to six months) for removal of the appendix. This clinical picture is a sharp contrast to the case with a true appendiceal abscess. These cases show the signs of continued infection and there should not be too much delay before operation is advised.

When a mass is encountered that is retrocecal and the peritoneal cavity is free, the procedure brought out by Karl Meyer is valuable. In these cases he closes the abdomen without disturbing

MORTALITY IN APPENDICITIS—JONES

TABLE I. A STUDY OF 229 CASES OF APPENDICITIS

Total number of cases studied.....	229
Males	139 61.0%
Females	90 39.0%
Number of patients operated upon.....	227 99.1%
Deaths	22 9.6%

Onset of Illness

Cases giving history of first attack.....	177 77.2%
Gradual onset	124 54.1%
Sudden onset	105 45.9%

Age Incidence

1-10	10.0%
10-20	46.0%
20-30	21.5%
30-40	13.0%
40-50	4.5%
50-60	3.9%
60-70	.4%
70-80	.4%

Duration Illness at Time of Admission

12 hours	13.0%
12-48 hours	58.0%
3 days	10.0%
4 days	6.5%
5 days	3.0%
6 days	.9%
7 days	3.9%
10 days	3.9%

Pain

Severe	95 41.4%
Moderate	118 51.5%
Slight	16 7.1%
Vomiting present	179 78.1%
History of catharsis	38 16.8%

Temperature Curve

98- 99	13.5%
99-100	35.0%
100-101	29.0%
101-102	11.3%
102-103	11.1%

Pulse Rate

70- 80	26.2%
80- 90	18.1%
90-100	15.3%
100-110	17.4%
110-120	10.4%
120 and above.....	12.6%

Muscular Rigidity

None	35 15.4%
Marked	54 23.5%
Moderate	93 40.6%
Slight	47 20.5%

Abdominal Tenderness

Marked local	74 32.3%
Moderate local	126 54.5%
Slight local	21 9.4%
None	1 .4%
General	7 3.4%
By rectal examination—tenderness in right pelvis	32 13.9%
Average leukocyte count.....	14,800

Urine Examination

Negative	191 83.1%
Albumen	23 10.0%
Sugar	2 .8%
Pus	13 5.7%

Operative Procedure

Appendectomy	135 59.3%
Appendectomy with drainage.....	77 33.5%
Drainage	15 6.4%
Not operated upon.....	2 .8%

Pathologic Diagnosis

Acute ulcerative appendicitis.....	150 65.5%
Acute suppurative and acute gangrenous appendicitis with perforation.....	68 29.6%
Acute appendicitis with abscess.....	11 4.4%

Complications

Wound infections	18
Bronchitis	2
Phlebitis	1
Diabetes	1
Intestinal obstruction	4
Salpingitis	1
Pregnancy	1
Massive lung collapse.....	1
Pleurisy with effusion.....	1
Subphrenic abscess	1
Liver abscess	1
Peritonitis	31

TABLE II. FATAL CASES

Number of fatal cases.....	22 9.6%
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Analysis of Fatal Cases

Duration of Illness at Time of Admission

12 hours	1
20 hours	1
1 day	5
2 days	9
3 days	3
4 days	1
5 days	1
6 days	1

Operative Procedure in Fatal Cases

Appendectomy	4
Appendectomy with drainage.....	16
Drainage	1
Not operated upon.....	1
Autopsies performed	9

Pathologic Diagnosis in Fatal Cases

Acute suppurative appendicitis and acute gangrenous appendicitis with perforation.....	14
Acute appendicitis with abscess.....	2
Acute appendicitis without perforation.....	6

Causes of Death

General peritonitis	11
General peritonitis and pneumonia.....	3
General peritonitis and intestinal obstruction.....	2
Intestinal obstruction	2
General peritonitis and diabetes.....	1
General peritonitis and liver abscess.....	1
Carcinoma of cecum.....	1
General peritonitis with subphrenic and liver abscess	1
Preoperative diagnosis of general peritonitis	18
Recovered	14
Died	4
Died without operation.....	1

anything and observes the patient closely. If the condition subsides an appendectomy is performed later. If, however, the abscess progresses he drains it extraperitoneally, thus avoiding the soiling of a clean peritoneal cavity.

Our practice is to operate on patients with general peritonitis of appendiceal origin, after giving them supportive treatment. The appendix is removed if feasible and the abdomen is closed without drainage in some cases, but usually drainage is established.

When a diagnosis is made of acute appendicitis with or without perforation, we feel usually that surgical intervention is indicated. There were eighteen patients in this series who carried an admission diagnosis of general peritonitis, one in such poor condition that operation was impossible. Seventeen were operated upon with three deaths.

Enterostomies were performed in those that developed intestinal obstruction. At the time these patients were being treated the nasal suction for relief of intestinal obstruction was not being used at the Ancker Hospital. It is possible these patients would have fared better if this type of treatment had been employed as it is

usually instituted earlier than the performance of an enterostomy. Three patients died from peritonitis and pneumonia. Pneumonia is always a serious postoperative complication and when accompanied by peritonitis one is faced with a most serious situation.

Suppuration in the appendiceal region occasionally leads to a liver abscess, due to extension of a pyelophlebitis in the mesenteric vein. This is one complication that is always fatal. Any patient with an infection that does not progress satisfactorily should always be closely observed for the localization of a suppurative process and the subphrenic abscess is a common offender. It should always be kept in mind and when located drainage is indicated.

It is readily concluded that the patient with acute appendicitis who is given immediate surgical relief does not offer the difficult problems of judgment that do those who, for one reason or another, are not operated upon promptly. It is this last group on which our thoughts and efforts must be concentrated in an attempt to lower the mortality rates with which we are faced.

TARSAL SCAPHOID FRACTURES AND THE SUBASTRAGALOID JOINT

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THIS very rare fracture, like that of its brother (carpal) scaphoid in the wrist, is important because, if undiagnosed or improperly treated, a painful, disabled joint will result. In this connection, any severe ankle "sprain" should be roentgenographed for tarsal fracture as well as for malleolar fracture.

Case Report

Mrs. G. B., aged thirty-two, a small, slender woman weighing only 110 pounds, tripped, stumbled and fell with her weight on the left foot. Severe, constant pain in the left foot appeared. When seen one hour later, the only objective findings were a bony protrusion proximal to the first metatarsal, marked tenderness over the area, and pain brought on by rotating the foot laterally, but none on flexion or extension. The roentgenogram (Fig. 1) showed the compression fracture and upward displacement of the scaphoid.

Closed reduction under ether anesthesia seemed successful, but reraying revealed that the reduction was not maintained by the plaster cast.

A small incision along the medial, superior border of the foot exposed a markedly crushed scaphoid, so dislocated that it was removed by incising only a few remnants of ligaments. The tendon of the extensor hallucis longus crossed over its narrowed superior margin. The bony defect was decreased by suture of the interosseous ligaments, astragaloscaphoid and cuneoscaphoid ligaments. Retention in position of inversion was obtained with the foot at right angles to the leg for a period of seven weeks, no weight bearing being allowed. Gradual resumption of use followed with the arch maintained by a support in the shoe.

At the end of three months, after active use of the foot, there was a little pain on lateral rotation, felt in the calcaneocuboid and calcaneoastagaloid articulation, *not* over the area of scaphoidectomy, nor was the dorsal scar tender. Pressure over the painful areas elicited moderate tenderness. Edema of the dorsum

of the foot was noted after standing for some time, but was not marked.

By restricting her walking, and elevating the foot for several hours each day, combined with contrast baths of hot and cold water, the foot is becoming much less painful. For reasons to be considered later, we do not believe a subastragalar arthrodesis to be of value here.



Fig. 1. Roentgenogram showing compression fracture and upward displacement of the scaphoid.

Etiology.—From the cases reported, the most frequent cause of this injury is a fall or jump from a height onto the feet. A sudden checking of the body's weight means that the impact is transmitted to the tarsals, especially the calcaneus, astragalus and scaphoid. If the point of contact is the heel, the calcaneus may be fragmented or crushed; if on the toes, the scaphoid may be fractured, as in Roederer's case.¹⁶ Wright²² is apparently alone in the belief that "80 per cent of fractures of the tarsal scaphoid occur in women wearing high-heeled, open front pumps, are caused by plantar flexion of the foot on the ankle joint, accompanied, as a rule, by inversion or eversion." Christopher³ points out that x-rays of feet wearing high heeled shoes demonstrate abnormally wide tarsal joint spaces. In our case, high-heeled shoes were worn, but Crossan's⁵ cases followed a fall from a height, as did those of Patel and Berard,¹⁵ Lasserre¹⁰ (first case), Bazert,² Wilson and Cochrane,²¹ Margotini,¹³ Solcard and Rolland,¹⁹ Baetjer and Waters.¹

Direct trauma by crushing beneath a car wheel was reported by Lasserre,¹⁰ and noted by Baetjer and Waters. Two cases occurring in toe dancers were observed.¹

Anatomy.—The weight of the body is transmitted through the tibiae and ankle joints to the tarsal bones. The astragalus, forming the inferior half of the ankle-joint, distributes the weight posteriorly on the os calcis, inferiorly on the sustentaculum tali, and anteriorly on the scaphoid, these relations forming that little-

known joint, the sub-astragaloid (the astragaloscaphoid joint is considered a part of the sub-astragaloid, as taught by G. G. Davis⁸). "This is one of the most important joints in the foot, because the astragalus is here situated at the summit of the anteroposterior arch of the foot,

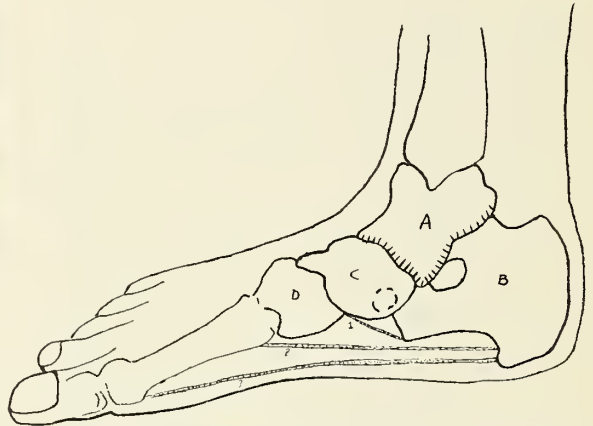


Fig. 2. The subastragaloid joint is shaded. Calcaneoscaphoid ligament (1); plantar ligament (2); plantar fascia (3). A—astragalus; B—calcaneus; C—scaphoid; D—first cuneiform.

and because the head of the astragalus is received into a socket made up of the sustentaculum tali, the scaphoid and the plantar calcaneoscaphoid ligament."⁶

Clinically, the subastragaloid joint is important because it is *only here that lateral motion takes place in the region of the ankle-joint* (the ankle joint being a hinge joint, and permitting motion only in flexion and extension). The plantar calcaneoscaphoid ligament supports the subastragaloid joint, and with the plantar ligaments and the plantar fascia, maintains the arch of the foot (Fig. 2), and supports the static body weight.

Frequency.—Until comparatively recent years, this fracture was considered excessively rare. Keen's Surgery (1915) and Rose and Carless (1922) do not consider it at all; DaCosta⁷ lumps fractures of all tarsals anterior to the midtarsal joint (scaphoid, cuboid, cuneiforms) into a few short lines (1933). European literature^{2,10,13,15,16,19,20} contains much fewer cases than does this country's, and frequently refers to their extreme rarity. Wright²² refers to twenty cases.

Symptoms.—Pain is the predominant symptom; it is severe, steady, increased by attempts to rotate the foot laterally. In older, untreated cases, there is much pain on walking over un-

SUMMARY OF CASES AND RESULTS

Author	Fracture	Treatment	Outcome
Top	Fracture, no dislocation	(1) closed (2) removal of scaphoid	Pain, attacks of arthritis for four months Attacks of arthritis nine months later
Solcard and Rolland	Transverse, with dorsal dislocation	Arch support	Much pain and disability 6 months later
Cotton	Fracture scaphoid, three cases	Open reduction; removal loose fragments	Full regeneration of bone; results good
Margotini	Transverse, with dorsal dislocation	Closed reduction; cast 19 days; massage, passive, then active, movement.	Good function 4 months. No pain on walking. Slight dorsal protuberance
Bazert	Two fragments; slight displacement	Immobilization; light massage later	Good function
Lasserre	1. Four fragments no displacement	1. Foot molded and immobilized 20 days	Returned to work in 3 months
Lasserre	2. Crushed foot	2. Immobilization	Edema, pain, limp at end of 3 months
Patel and Berard	Fracture and dorsal dislocation	Closed reduction	Little functional disturbance
Patel	Fracture, with dorsal dislocation	(1) Closed (2) Scaphoidectomy	Persistent pain and difficulty in walking Complete relief of pain
Crossan	1. Fracture with dorsal dislocation (8 months)	1. Scaphoidectomy	1. Other ankle surgery to be done, so result not known
	2. Fracture, dislocation (3 months later)	2. Scaphoidectomy	2. Relief of pain; light work in 4 months.

even surfaces, for the same reason, namely, that the subastragaloid joint cannot function properly. Crossan⁵ emphasizes this point, and that walking for more than a few blocks is quite painful.

Tenderness is found over the scaphoid; swelling, if not seen till later. Bony protrusion on the dorsum of the foot is frequently present. A typical lateral view roentgenogram (Fig. 1) following indirect injury shows dorsal displacement of a flattened, wedge-shaped scaphoid, and closer approximation of astragalus and cuneiforms. Direct trauma or severe indirect violence may result in fragmentation into three or four portions.

Treatment and Prognosis.—These must be considered together, as the ultimate outcome is often directly dependent on the treatment. It is well recognized that tarsal fractures may be disabling for many months, or that there is a considerable percentage of permanent disability

in some cases, even in the most experienced hands.[†]

Closed reduction may be attempted, if the fragments are not separated or if the scaphoid is not markedly deformed or dislocated,^{2,3,10,13,15,20} but must be closely checked by roentgenograms, as maintenance of reduction is difficult.¹⁹

Open reduction seems the procedure of choice,¹³ with removal of widely separated fragments.¹⁹ "Full regeneration of bone follows even liberal removal" (Cotton⁴). Careful suture of interosseous ligaments should be done. Excision of the entire scaphoid is indicated if markedly deformed.

Late, unreduced or disabling scaphoid fractures are treated by excision of the entire bone, which usually gives marked relief from the pain.^{5,10,15,19} Crossan does not believe that a bone graft is necessary to fill in the bony defect

[†]See summary of cases; read abstract on Fractures of the Os Calcis, from the French Surgical Congress, Jour. Am. Med. Assn., 105:24, (Dec. 14) 1935.

thus created. It would seem advisable, however, on these anatomic grounds:

1. The internal longitudinal arch being shortened and the external long arch remaining the same length, it is inevitable that the foot anterior to the astragalus would angulate medially, result in lateral strain on the calcaneocuboid and subastragaloid articulations.

2. Removal of a portion of the arch shortens it in the vertical plane, and brings it closer to its base.

3. The astragalus, being no longer supported anteriorly by the scaphoid, tends to rotate forward on the calcaneus. This process might continue to the point of changing the weight bearing surface of the astragalus in the ankle joint. X-rays of our case at the end of ten weeks show that these changes tend to occur.

Subastragalar arthrodesis, suggested by Wilson for os calcis fractures, would prevent painful motion in the subastragaloid joint, but would not prevent 1 and 2 above. Martin¹⁴ states that his results with this procedure have been good.

The suggestion has been made that a portion of the cuboid be removed simultaneously,¹¹ which would permit closer approximation of the astragalus and cuneiforms, thus restoring direct continuity of the long arch. As the foot would be shortened, bringing it closer to the ground (Fig. 2), this suggestion has not been used to any extent.

Sequelæ of poorly treated fractures include traumatic flat foot,¹⁶ marked pain in the foot on walking, and quick fatigue,⁵ deformity of the dorsum of the foot, attacks of "arthritis"¹⁹; contractures, multiple ankyloses and mediotarsal arthritis.¹⁰

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The Antianemic Principle of the Stomach

Since the discovery of the effect of liver and of stomach in the treatment of pernicious anemia, many attempts have been made to elucidate the physiologic processes involved and to clarify the nature of the hematopoietic principle or principles of these organs. The experiments of Greenspon (*The Journal A. M. A.*, Jan. 25, 1934, p. 266) now provide a simple explanation for the known facts without hypothesizing the existence of an extrinsic factor. When desiccated stomach was incubated with pepsin and hydrochloric acid and subsequently administered to a patient with pernicious anemia, a reticulocyte response did not occur. Stomach tissue was then depepsinized and administered; a definite hematopoietic effect resulted. The depepsinized tissue incubated with pepsin and hydrochloric acid was inactive; but when it was incubated with hydrochloric acid alone (in the absence of

pepsin) reticulocytosis was obtained on administration. Thus it was demonstrated "that (1) the pepsin content of normal hog gastric mucosa could be removed without destroying the antipernicious anemia principle, (2) that peptic activity destroys the antipernicious anemia principle and (3) that hydrochloric acid alone does not." On the basis of his experiments, Greenspon concludes: The beef (or other source of "extrinsic" factor) when incubated with normal gastric juice binds pepsin and prevents it from inactivating the antianemic principle which otherwise occurs unless the precautions adopted by Greenspon are used. Utilizing the knowledge that the antianemic principle in the stomach is inactivated by pepsin, Greenspon has been able to improve greatly on the potency of preparations of stomach tissue developed by Sharp and by Sturgis and Isaacs and of concentrates of gastric juice used by Morris. (*J. A. M. A.*, January 25, 1936, p. 295.)

ANKLE JOINT FRACTURES

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FRACTURES of the ankle joint, like all fractures, are of great antiquity. Cotton says, ever since the Nordic wore brogans, or before.

Mr. Harry Platt says, "The subject of ankle fractures is shown to be an old chapter in the history of surgery and, though a commonplace problem in surgical handicraft, is classical in its antiquity and appears strangely new as each succeeding generation comes fresh to its difficulties, often oblivious of the wealth of knowledge already bequeathed by the older writers."

These words offer a suitable explanation for the constant literature that has appeared on fractures of the ankle since the classical description by Percival Pott, following his injury in 1756. After Pott came Dupuytren, the brilliant French surgeon, who lived from 1777 to 1835 and was the next to contribute to the knowledge of ankle joint fractures. The French, in speaking of Dupuytren's fracture, seem to mean the same lesion that the English do in speaking of Pott's fracture.

After Pott and Dupuytren came Sir Astley Cooper, who, in 1822, described accurately practically all lesions in fracture of the ankle. Scarcely a new one has been found with the advent of the x-ray. Then came Maisonneuve who, in 1840, called attention to the importance of the inferior tibio-fibular ligaments in the mechanism of ankle fractures. In 1872 Tilleaux called attention to a rare result of abduction and external rotation which consisted of a supra-malleolar fracture of the tibia, the fibula breaking below the tibio-fibular joint usually, but sometimes above. In 1877 Honigschmeid made 125 experiments on the cadaver to determine the mechanism of ankle joint fractures. In 1892 Stimson made a distinction between fractures produced by abduction and those by external rotation. Since the x-ray many important papers have been published by distinguished men on this subject. Perhaps the most outstanding monograph is that of Ashhurst, published in 1922, with an analysis of three hundred cases.

Fractures of the ankle joint may include the

tibia and fibula and astragalus, they may be simple or compound or comminuted, fresh or old with malposition requiring reconstruction operations.

In this discussion only simple fresh fractures of the lower end of the tibia and fibula will be considered.

Anatomy.—Some knowledge of the anatomy of the ankle joint is essential to the proper understanding of ankle joint fractures. The ankle joint is a hinge joint but not absolutely so, as there is some lateral movement, but the main movement is antero-posterior. It is formed above by the tibio-fibular mortise and below by the trochlear surface of the astragalus, which fits into the mortise like a wedge. It is one-fourth wider in front than behind. The projections of the tibia and fibula beyond the level of the tibial roof form the internal and external malleoli respectively. The malleoli form the sides of the mortise. There is a projection on the posterior side of the tibia sometimes called the posterior malleolus. There is a groove on the external lower surface of the tibia formed by the anterior and posterior tubercles into which the fibula fits very snugly. At this point the anterior and posterior inferior tibio-fibular ligaments and felt-like interosseous membrane bind the two bones together most securely. There is a very slight range of motion between the tibia and fibula at this point. The malleoli serve to keep the foot well placed under the leg bones. The astragalus acts as a ballbearing joint and has no muscles attached to it. The ligaments of the ankle joint holding the foot attached to the leg bones are the anterior, posterior, internal lateral, and external lateral ligaments. The lateral ligaments are developed more strongly and hold the joint nearly to a true hinge, permitting only a little lateral movement, the principal movement being antero-posterior. The internal lateral ligament is fan-shaped, passing from the internal malleolus anteriorly to the scaphoid and the os calcis, and posteriorly to the median tubercle on the posterior surface of the astragalus. The external lateral ligament has three distinct bands

passing from the external malleolus, one going forward to the lateral border of the neck of the astragalus, the middle passing down to the os calcis, and the posterior passing to the lateral tubercle on the posterior surface of the astragalus. The posterior band is a very important factor in the mechanism of ankle fractures. It is so strong that it seldom ruptures, and the fibula and astragalus are seldom, if ever, separated in ankle fractures; thus, if the fibula fractures, the fibular fragment and astragalus are carried along together in any displacement. In backward displacement of the foot, the fibula and tibia must either be separated or the astragalus and fibula must be separated. As it is claimed the latter event does not occur in ankle fractures, therefore, in practically all posterior dislocations, as well as lateral, there must be a separation of the tibia and fibula, which means a rupture of the tibio-fibular ligaments. Remembering that the astragalus and fibula do not separate because of this strong attachment, serves as a key to the understanding of ankle fractures. The ankle joint has an approximate movement of about 80 degrees, of which 20 degrees are dorsiflexion and 60 degrees extension, or plantar flexion.

Incidence and Causation.—Kellogg Speed, in reviewing 1,316 fractures at Cook County Hospital, found 208 ankle joint fractures or about 15 per cent. I have reviewed 1,115 fractures occurring in our work at Shipman Hospital and find 151 ankle joint fractures or about 13.5 per cent. It may be said that about one-sixth of all fractures are ankle joint fractures.

Ankle joint fractures are not very common in children, but they are the most frequent of the severe fractures in adults. Most of the cases occur in strong, healthy adults who are leading an outdoor life and are engaged in arduous occupations. The great majority of them are caused by indirect violence. Ashhurst estimated only one per cent due to direct violence, such as crushing injuries, being run over by vehicles and other direct injuries.

There are three types of indirect force constituting the cause of 90 to 95 per cent of ankle fractures. These three forces are: (1) external rotation; (2) abduction or eversion; (3) adduction or inversion; and to these, (4) an upward compression thrust on the ankle mortise.

External Rotation.—Maisonneuve was the first

to call attention to external rotation. In this movement the foot is turned or rotated outward on the ankle with the leg bones as a vertical axis, and the strain, which is a torsion or twisting, is felt by the fibula and a spiral or oblique fracture is produced. The fracture is always higher on the posterior surface of the fibula than on the anterior. The obliquity varies and the lower end usually enters the external malleolus. In practically all these fractures the tibio-fibular ligaments are not ruptured and there is no separation of the tibia and fibula. If the violence continues, the internal lateral ligaments may be torn or the internal malleolus pulled off. In some cases the avulsing force is so great as to fracture the whole lower end of the tibia, or cause epiphyseal separation in children.

Abduction.—The second force to be considered, or the next most frequent cause of fracture of the ankle, is that of abduction. In the abduction force the astragalus tends to rotate outward in the mortise and exerts a bending strain on the fibula and great torsion on the internal lateral ligament. It is considered that this is certainly a different mechanism than external rotation because in external rotation the first, and often only, lesion is an oblique fracture of the fibula. In straight abduction the first lesion is either a fracture of the internal malleolus or a rupture of the internal lateral ligament. This has been proven in experiments by Honigschmeid and others. The force continuing, a crushing fracture of the external malleolus below the tibio-fibular ligament is produced—the bi-malleolar fracture by abduction. It is interesting to note the influence of the tibio-fibular ligaments in fracture by abduction. If these ligaments do not rupture, the fracture of the fibula is below the tibio-fibular joint, but if the ligaments tear, thereby allowing separation of the tibia and fibula, a fracture of the bending type occurs, usually in its weakest point, the surgical neck above the lower tibio-fibular joint. The x-ray pictures show the separation of the tibia and fibula and a flexion or inward bend of the fibula. The fracture of the fibula, being of the bending type, follows the law of Messerer; thus it breaks rarely transversely, a little more frequently slightly obliquely, and nearly always is comminuted in a typical manner, as illustrated by Messerer, with a wedge of bone from the concavity of the bend, the apex being directed to-

ward the tibia. In fracture by abduction, as in external rotation, a separation of the whole lower end of the tibia may result, but the fibula fracture is of the bending type and not the torsion or spiral type. In some fractures it may be very difficult to say whether they are produced by external rotation or abduction. A combination of both forces is probably present.

Adduction or Inversion.—The third most prominent mechanism is that of adduction or inversion. The first lesion to occur is fracture of the external malleolus, usually at or below the level of the tibial roof, followed, if the force is continued, by a compression fracture of the internal malleolus from the inward thrust, both malleoli being fractured. It is called bi-malleolar fracture by adduction or inversion in contradistinction to bi-malleolar fracture produced by abduction. These fractures are also called "reverse Pott's." There may also occur a splitting fracture of the tibial shaft due to the weight of the body, forcing the tibia heavily on the displaced astragalus.

Upward Compression.—While the great majority of fractures of the ankle joint are caused by these three forces, external rotation, abduction and adduction, there is still another force to be considered, that of compression, or the effect of the body weight thrown on the injured limb at the time of injury, usually from falls from a height. Its general effect is to increase the separation and displacement from the previous mentioned forces. It also produces the so-called "Cotton's fracture" or posterior marginal fracture of the tibia. Cotton called attention to this fracture several years ago, although it seems to have been known by several of the older writers, including Cooper and Dupuytren. It sometimes occurs as an isolated lesion but usually is associated with fracture of the fibula by external rotation or abduction with gross displacement of the astragalus. It consists of a triangular fragment extending down into the ankle joint in the neighborhood of the tibio-fibular joint. The fragment usually remains attached to the external malleolus by the posterior inferior tibio-fibular ligament and is often displaced backward with the external malleolus and astragalus.

In the production of these fractures, Ashhurst, in a most careful and authoritative study of 300 cases, found that external rotation produced sixty-one, abduction twenty-one, and ad-

duction 13 per cent; in other words, external rotation, abduction, and adduction caused 95 per cent of all ankle joint fractures.

Diagnosis and Clinical Consideration.—In all injuries about the ankle joint in which there is a history of forcible movement of the foot, a fracture should be suspected. Usually the injury is so severe that the patient cannot walk. The foot is usually held in plantar flexion and everted in varying degrees, the internal malleolus being prominent. In the severe cases there are abnormal mobility, especially in the lateral direction of the joint, points of tenderness around the ankle and often great swelling. It hardly seems necessary to detail all the clinical signs in the diagnosis of a fracture with which all physicians are quite familiar, suffice to say that in all ankle injuries a full radiographic examination should be made, especially when there is an indirect forced type of movement such as external rotation, abduction, or adduction. While the more serious types of ankle joint fractures are plainly evident without x-ray, there are many ankle joint fractures in which it is very difficult to determine whether or not a fracture is present. The x-ray picture will always clear up the diagnosis besides showing plainly just what lesions have been produced. Both antero-posterior and lateral x-rays should be taken, as the simple oblique fracture of the fibula may not show with an antero-posterior view but will always show in a lateral, and a fracture of an internal malleolus may not show in the lateral but will always show in the antero-posterior view. Other x-rays at different angles may be taken to assist in diagnosis. The x-ray also shows the varying degrees of displacement of the astragalus in its relation to the tibia. Sometimes these displacements are very slight but they should be considered in the treatment, as perfect reduction of the astragalus in relation to the tibia is very necessary for good recovery of function. Fractures of the ankle joint were first considered as dislocations and many of these are really fracture dislocations.

Prognosis.—Dr. J. B. Murphy once said in his Clinics, "Failure to secure a good result from treatment occurs more commonly in connection with Pott's fracture than with any other type except a Colles'—Colles' fractures more frequently result in a failure to restore normal conformation but one not nearly so detrimental to the

comfort and service of the patient as in the case with a Pott's fracture with poor conformation."

Prognosis in ankle fractures depends largely upon good anatomical reposition and retention over a sufficient period of time for firm healing of bones and ligaments.

Not only must normal alignment of the foot antero-posterior and laterally be obtained, but the tibial plafond and malleoli must be placed so as to grasp and hold the body of the astragalus. Even with perfect anatomical position a degeneration of cartilage along the fracture line of the articular surface with traumatic arthritis may develop.

Emergency Treatment.—"Splint 'em where they lie." This is a slogan heard and emphasized much now in the treatment of fractures; a very good and correct slogan, and while one might think it new, nevertheless, it is old. Percival Pott recognized the principle involved when he was injured in 1756. He would not allow himself moved, but lay on the cold cobblestones of a London street until proper material was brought and his leg well splinted. As emergency treatment, fractured ankles can be splinted with a pillow or by well padded lateral board splints for transportation to the hospital.

Treatment.—As Conwell says, fresh fractures of the ankle resolve themselves into two main groups, those with no displacement and those with displacement. Those with no displacement comprise a large percentage, but one should be very sure after careful x-raying and study of the fracture that there is no displacement of fragments before placing a fracture in this group. This group may comprise practically all fractures of the ankle joint, as one or both malleoli, the articular surface of the tibia and its margins, and supramalleolar fractures. Having determined no displacement, fixation can be done at once without an anesthetic, a circular plaster Paris cast extending from the toes to the tubercle of the tibia with the foot placed at ninety degrees dorsiflexion and in about mid-position between adduction and abduction so that a line dropped from the middle of the patella will pass between the first and second toes. If there is little swelling, very little padding need be used. The Stimson molded lateral and posterior splint of plaster Paris may be used with satisfaction. Speed has also used just a single external lateral splint winding around the foot at the lower

end. If there is considerable swelling, a larger amount of padding may be necessary. The patient should be put to bed and foot elevated and watched carefully for twenty-four hours for the appearance of pain, swelling, coldness, cyanosis of the toes; if these signs appear, the cast should be split at once and loosened. Usually at the end of two weeks it may be necessary to apply a new and better fitting cast because the swelling has gone down. The foot and leg have shrunk and the cast has become loose. At this time one may use one of three general methods: (1) a permanent fixation cast, allowing the patient to continue on crutches; (2) a fixation cast, incorporating a steel walking strip of the Boehler type and allowing the patient to walk on this support instead of using crutches; (3) a strong cast, bivalving it so that it may be taken off daily and the leg given massage, bathing, passive and active movement (short of any pain) and general physiotherapy and electrical stimulation as carried out by Clay Murrey of New York City. Weight bearing is usually not begun for six or eight weeks depending on the severity of the fracture, this to give plenty of time for firm union of bones and torn ligaments. When all splints are off in six to ten weeks and weight bearing is begun, a shoe with a stiff shank should be worn, also an arch support may be used, and a Thomas heel raised slightly on the inside with a leather sole raised also on the inside, this to give support and to prevent pronation of the foot. Sometimes it is necessary, in addition to this, to provide the Jones outside iron brace with inside T-strap to give proper support and to keep the foot inverted. Wedging the inner side of the shoe is an old practice used by Ambroise Paré.

In the case of the group of ankle fractures with displacement, the reduction should be done at once. No matter how much swelling, we have never waited for the swelling to go down. If it is very great, much of it may be reduced by massage. In doing the reduction, an anesthetic should always be used, either local, general, or spinal. One surgeon wrote me that he preferred spinal to any other as it gave better relaxation for reduction in the badly dislocated ankle joint fractures. We have used general anesthetics oftener than anything else. We have also used local and spinal. In reducing these ankle fracture dislocations it will assist to re-

member that the malleoli which are broken off tend to move with the dislocated astragalus and that the malleoli which are not fractured tend to be separated from the astragalus because of



Fig. 1. Complicated ankle joint fracture consisting of: (1) fracture of both malleoli about the level of the ankle joint; (2) posterior malleolus fractured—so-called Cotton's fracture; (3) dislocated astragalus, outward and backward, carrying with it the external malleolus. This probably constitutes the so-called tri-malleolar fracture mentioned by Henderson.

the loosening of the lateral ligament on that side. Anatomically the astragalus is bound firmly to the foot, and the foot can be used as a lever in reducing the astragalus. In considering displacements, Conwell says one should determine whether or not the distance between the malleoli is broadened, whether or not the astragalus is in its normal position, whether or not the external malleolus is pushed backward, whether or not either malleolus is displaced upward and whether or not the normal contour of the lower end of the tibia is present. After the reduction is made, a plaster cast may be applied extending from the toes to midway of the thigh, the knee bent in slight flexion, the foot usually in slight inversion except in the case of bi-malleolar fractures when there is danger from inversion of the

foot of bringing the external malleolus under the tibia and crowding the internal malleolus too far inward. The best position in these cases is to place the foot about midway between abduction and adduction with the astragalus squarely under the tibia and the foot in dorsiflexion of ninety degrees. The patient is put to bed and treated in the same manner as the case without displacement except that in some of these severe fracture dislocations weight bearing cannot be attempted for ten weeks. In these bad dislocation fractures of the ankle, several manipulations are sometimes necessary before a satisfactory reduction is obtained. One dislikes to submit a patient to several attempts at reduction and there is a temptation to accept a reduction that is not quite satisfactory. The courageous attitude is to tell the patient the exact situation and insist on further manipulation. In this connection, however, it sometimes surprises one to find that an ankle joint fracture that has not satisfied the surgeon as to reposition and conformation, and which seems a poor functional result at first, will after one to three years be very satisfactory, at least as to function. But the rule in all joint fractures is to get as perfect apposition as possible. In fractures of long bones this is not so necessary so long as alignment is good. The so-called Cotton's fractures, especially when combined with internal and external malleolar fractures and dislocations of the astragalus, are troublesome and difficult to reduce. Reduction of these troublesome posterior and lateral dislocation ankle joint fractures combining a Pott's and Cotton's fracture is best done by placing the knee in semiflexion and making traction and counter-traction on the foot in slight plantar flexion; the heel and foot is grasped and pulled in line with the leg. When the foot has been pulled down to the normal position, the posterior displacement is corrected by pulling the foot directly forward, counter pressure being maintained on the front of the leg. The posterior fragment of the tibia in the Cotton's fracture is reduced and held by strong dorsiflexion, and inversion done to correct the displaced external malleolus. If both malleoli are fractured, care must be taken not to invert too strongly. The cast is then applied with the foot in slight inversion and dorsiflexed about ninety degrees, care being taken to prevent a dropping back of the foot on the leg while putting on the cast.

Henderson says the two fractures of the lower extremity that leave in their wake the most serious disabilities are certain fractures of the ankle and of the hip. Henderson speaks of a tri-malleolar fracture of the ankle which is a Pott's fracture plus a Cotton's fracture. With such a fracture there is tearing off of the internal malleolus, fracture of the external malleolus or fibula in the lower two and one-half inches, and fracture of the posterior malleolus; hence the term tri-malleolar.

Quoting from Henderson, these fractures should be reduced at once. They seldom require open operation. The astragalus must be brought forward and replaced in its normal position in the mortise between the malleoli. An x-ray antero-posterior shows a slight convexity of the articular surfaces of the lower end of the tibia and concavity of the astragalus. Laterally, an opposite condition prevails. The convexity of the astragalus fits into the concavity of the tibia. If these two surfaces fit antero-posterior and laterally, little attention need be paid to slight displacement of malleoli, although it is well to have the malleoli in as good position as possible and especially should the tibia and fibula be pressed well together if there be a diastasis or separation of the tibia and fibula at the tibio-fibular joint. Very rarely does it seem necessary

to do open operation on ankle joint fractures. Those fractures that do require it are usually those in which in the Cotton's fracture the posterior fragment with its upward displacement keeps recurring after all attempts to reduce it and keep it in position. Sometimes it may be necessary to fasten a malleolus in place by nailing or other means, or to secure a tibia and fibula together by foreign material when the diastasis is not easily overcome or if it tends to recur after reduction. Skeletal traction with the Steinmann pin, or Kirchner wire through the os calcis may be useful in those fractures of the tibial articular surface which recur after reduction by manipulation.

There is a great impetus in the profession at the present time to improve the treatment of all classes of injury and to cut down the time of disability, and especially fractures. A new specialist, the industrial surgeon, seems to be evolving.

Dupuytren said, over one hundred years ago, of ankle joint fractures, "Under the most favorable circumstances, they almost always leave a deformity and lameness which renders progression difficult and painful."

With our present-day knowledge, the x-ray and facilities for care of these fractures, Dupuytren's dictum should lose its sting.

PHYSIOLOGIC FACTORS RELATING TO SURGERY OF THE COLON*

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THE functions of the large intestine are not of such prime importance in human economy as are those of the small bowel, and neither are these functions so many or so varied. That the small intestine, or a large portion of it, is indispensable to the maintenance of life is an established fact; however, this does not hold true for the large bowel, since life can be sustained more or less adequately in the total absence of this organ. It was even considered for a long time that physiologic activities of the colon were limited to those of a catch basin for

the reception and retention of feces until a convenient time for evacuation arrived. However, in recent years, additions to our knowledge of the many uses which the large bowel serves have given us a better insight and understanding in the diagnosis and treatment of the diseases of this organ and consequently improvement in results from such treatment.

The large intestine is distinctly a double organ, being made up of essentially the right and left portions, facts which may be substantiated by evidence taken from its embryologic development, from its anatomical structure, from its

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physiologic functions and finally by the difference in effects resulting from disease in its various segments.

The bifunctional nature of the large intestine is especially obvious when one considers the embryologic development of this organ. The right or proximal one-half of the colon is derived from the midgut along with that portion of the small bowel distal to the papilla of Vater. All this segment of the intestinal tract is an absorptive one and extends distally as far as the splenic flexure. The mechanism which brings about these anatomical relations is one of pre-natal rotation of the colon around the superior mesenteric artery in a counter clockwise direction. An attachment of the colon in the region of the splenic flexure is made in the early months of fetal life, and by the third or fourth month another attachment has been made under the liver, thus giving origin to the hepatic flexure. The left arm of the colon, that portion distal to the splenic flexure, takes origin from the hind gut. The distinct dissimilarity of development of the two portions of the colon again impresses one as to differences in physiologic function of the two arms.

From anatomical relations and differences in structure of the two portions we are again impressed with the bilaterality of the colon. The absorptive portion of the intestinal tract along with the proximal segment of the large gut derives its blood supply from the superior mesenteric artery and its branches, as indicated from studies of the embryological development in this region, while the left colon, being derived from the hind gut, takes its vascular supply from the inferior mesenteric artery. Furthermore, the right colon with its large diameter, its capacious lumen, and its thin walls is ideally adapted for functions of absorption and it is even true that the cecum at times, especially in some animals, has been regarded as a second stomach. The content here is semi-liquid and the propulsion of feces in this region is slowed down and regulated by small churning movements. In contradistinction the left colon has strong muscular walls which are more fixed; its mesentery is shorter and the diameter of the gut here is smaller and, as a result, much more suited for purposes of evacuation. Furthermore, the contents in this location are hard and the move-

ments here are large strong ones, further enabling propulsion and expulsion. The importance of these facts in relation to surgical procedures will be dealt with later.

A study of the mode of development and the physiologic effects of disease in the two segments of the colon likewise indicates differences in the type of lesion found, as well as differences in the effects on the individual. Pathologic lesions affecting the right side of the colon result in disturbances of physiologic equilibrium, such as anemia and toxemia. In fact, it is not uncommonly found that this type of anemia may be very profound although unattended by any visible loss of blood so that, in the absence of other symptoms, diagnosis may be obscure. It has become axiomatic that in cases of this nature a roentgen examination of the colon should routinely be made. In sharp contrast to the signs of disease of the right colon are those of the left colon, where obstructive phenomena are quite constant and take place early. These obstructive features are the combined result of two factors: the anatomical characteristics of this portion of the bowel and type of the growth. The distal half of the gut, especially from the splenic fixture downwards, is thicker, its walls are more inelastic and its lumen is smaller than that of the proximal colon. In addition, growths here are of the encircling "napkin ring" type, a combination of conditions which favor early stenosis. In fact it is not uncommon to find cases of this nature in which the first clinical sign of the presence of carcinoma is complete obstruction. These patients present a particularly difficult problem, since one of these conditions alone is very dangerous and when the two are combined, the risk is enormously increased.

It is thus evident that, because of the bifunctional nature of the large intestine, most diseases, especially those of a surgical nature, should be regarded differently, depending upon the location in the colon of the lesion. This is especially true when one comes to a consideration of problems involved in resections of the colon. In the distal portion of the large gut, it is usually much more dangerous to resect a segment and make a primary anastomosis in one stage than it is to first employ a drainage operation, such as a colostomy or cecostomy, and sidetrack the fecal current. On the other hand,

it is relatively safer, in right colon lesions, to do a short-circuiting operation and in addition to resect the diseased area at one sitting, depending, of course, to a large extent, on the general condition of the patient and characteristics of the lesion. The factor of obstruction is rarely encountered when considering the treatment of lesions in the proximal colon. Aside from the question of relieving obstruction in left colon lesions, and of doing graded operations where the general condition of the patient comes into consideration, there is another factor of which cognizance is not often taken.

Peristaltic movements of the distal colon, as well as anatomical conformations of this portion of the gut are of a distinctly different nature than those of the right colon and small bowel. In the distal large bowel, the thick muscular walls have for their purpose forceful, strong movements which are distinctly prolonged and are made under considerable tension. In fact, tonus waves here may last as long as ten to fifteen minutes. In addition, there are superimposed on these long contractions smaller contractions often lasting one to two minutes. Thus it is evident that, with such prolonged tension on an anastomosis, healing would be very difficult, largely because of the local ischemia which is produced. This is further evidence as to the value of preliminary colostomy (Larson and Bagen). Furthermore, the contents of the left colon are rather hard and incompressible, and this condition, combined with relative fixation of the mesentery, tends to favor pulling apart the suture lines of an anastomosis. The blood supply in this region is not as abundant as it is in the small bowel, another factor tending to retard healing, since any tension on suture lines results in further ischemia of the anastomosed margins and gives increased chance for infections to gain headway, consequently there is greater possibility of failure of the tissue to heal. If a preliminary drainage has been done, resection of a segment of bowel followed by anastomosis is more liable to heal satisfactorily for several reasons. The first, of course, is the side-tracking of the fecal current and the decompression of the bowel. Secondly, since a certain amount of peristaltic motion of the bowel is due to impulses traveling along the muscular layers, interruptions of these muscular fibers by cutting across the bowel in making a

colostomy results in many of these waves being stopped and they cannot jump from the proximal to the distal stoma. This has the effect of keeping the side-tracked loop of gut much more quiet with consequent avoidance of tension on suture lines. It is, of course, true that the latter segment contains no fecal material and that it can be cleansed readily so that inflammatory reactions may subside and exudates may be absorbed, but the factor of inactivity is, likewise, an important one in successful promotion of healing.

It is true that the mesenteric nerves (sympathetic fibers), which run along with the blood vessels, do reach the bowel wall regardless of interruption of continuity of the gut, as demonstrated in a previously published communication (Larson and Bagen). However, the main motor nerve to the colon, the pelvic nerve (or *nervi erigentes*), supplies only the distal portion of the left colon and this nerve plexus lies on the surface of the bowel wall between the muscular layers. Consequently, it is readily understandable why motor impulses through the gut are interrupted by section of the bowel. When reestablishment of the continuity of the bowel is again made, coördination of the intestinal movements is usually resumed in a relatively short time with no particular difficulty, although it is rather common to find that some difficulty in bowel habits is experienced for some time. A parallel situation exists in many cases of local pain occurring post-operatively after appendectomy. It is usually true, when recurrent pains are present for a time after removal of the appendix, that adhesions are considered to be the source of this embarrassing discomfort, and this is no doubt possible in many instances. On the other hand, I am convinced that, in many instances, this pain is due to interference with conductivity of nerve impulses through muscle tissues resulting from removal of the appendix. This has the effect of temporarily producing stasis in the proximal cecum, or at least an incoördinated motility in this region so that pain, flatulence and other symptoms result. The symptoms frequently continue for varying lengths of time until reestablishment of normal motility has been made.

In the pre-operative and post-operative management of individuals harboring diseases of the colon, all factors are directed towards producing

and maintaining physiologic rest of the bowel so that healing without complications may be facilitated. Pre-operatively, a diet low in residue, emptying of bowel of gas and fecal content by properly controlled catharsis, cleansing enemas, and final intestinal sedation along with supportive measures intended to improve the patient's general condition, all are intended to have the bowel at the time of operation empty, collapsed, quiet and clean. Post-operatively, we have routinely employed, to very great advantage, continuous nasal catheter suction siphonage to prevent the entrance of air into the intestinal tract, a procedure which eliminates, to a large extent, any gaseous distention and consequent aggravation of peristalsis. After distention, nausea and vomiting have occurred, they can be relieved by this suction method but ileus is much more easily prevented than relieved. It should be kept in mind that the extent of surgical trauma within the peritoneal cavity, the length of anesthesia and the general condition of the patient are other factors which determine the degree of ileus to be expected post-operatively. Morphine in frequent moderate doses has a beneficial effect because of its property of relieving pain, restlessness, thirst and apprehension, as well as its ability to increase intestinal tone. Its tonic effect results in maintenance of the proper absorptive function of the bowel so that toxemia is definitely lessened since it has been proved that distention of the gut is notably accompanied by absorption of toxic products. Constipation frequently accompanies the use of morphine and is most likely the result of inhibition of the defecating reflex, accompanied with increase of tone of the sphincters. A compensatory diarrhea frequently develops after withdrawal of morphine and its mechanism is obvious. The most important factor in prevention of intestinal activity is the withholding of food and fluids by mouth. In our opinion, with the act of swallowing, even though it be only a small amount of water, and especially with the ingestion of any solid food, a peristaltic wave is initiated which usually travels the entire course of the intestinal tract down to the anus. This increased activity is very prone to spread any inflammatory process which may be present in the peritoneal cavity. When the propulsive power of the bowel has been regained as evidenced

by motility of gases in the abdomen (gurgling, et cetera), fluids and, later, food may be administered orally and these, along with heat to the abdomen, are an excellent stimulus to complete recovery of normal bowel activity.

It is best, in any patient who goes without ingestion of fluids and foods for any length of time, to stimulate flow of saliva, especially from the parotid gland, by use of chewing gum, or the sucking of lemon. This definitely lessens the incidence of post-operative parotitis. In brief, the less the swallowing, the less the peristaltic activity initiated.

Fluids, combined with saline or glucose, or both, in these cases are best administered through the intravenous route, less satisfactorily by means of hypodermoclysis. Proctoclysis, of course, in any type of colon operation is contraindicated since fluid given by this method can only be absorbed by being carried over into the right colon, a process which is evidently carried out by a mechanism of antiperistaltic waves, and, of course, the latter would, therefore, have considerable effect on the retardation of the process of healing.

The factors mentioned have, primarily, for their purpose the promotion of local healing in the bowel by means of quieting peristalsis and by increasing the tone of the bowel, but, of course, measures which increase the general resistance and condition of the patient must not be neglected, such as transfusions, large amounts of parenteral fluids, and so forth. In the immediate convalescence of the patient, after four or five days, it is wise to start, very judiciously, the use of clear fluids, then soft foods and finally, as determined by the tolerance of the patient, a diet high in calories and vitamins, but low in residue. As time goes on, the patient will find out for himself the type of food best suited to his needs. After ileostomy an important problem arises concerning the maintenance of a positive fluid balance, especially the first few weeks, post-operatively. Since the absorbing portion of the colon is out of the circuit and is non-functional, large amounts of fluids must be given, preferably intravenously, to prevent dehydration. The lower ileum, however, in time takes over the function of the colon as regards absorption so that a return to normal health as far as the ileostomy alone is concerned may

be expected. In ileocolostomy, especially ileosigmoidostomy, frequent and loose stools may be a rather persistent symptom, but by the judicious use of a proper diet, this can practically always be controlled. Compensatory changes, both in the anatomical and physiologic makeup of the bowel take place to aid in a return to normal conditions. Patients who have had a colostomy usually experience a temporary looseness of the stools, varying in degree and duration but eventually these individuals establish a marked regularity in their evacuations. They soon experience little inconvenience in the care of the stoma except during acute intestinal upsets when the watery discharges may be so un-

controllable as to require attention at the most unexpected moments. Patients who, prior to colostomy, are naturally constipated, have the least inconvenience in the regulation of their habits. Here, again, the individual himself soon learns by experience best as to his dietary and other habits so that most of these patients do not feel themselves handicapped in the ordinary duties of life by the presence of a colostomy or ileostomy.

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MYOCLONUS EPILEPTICUS IN CHILDREN

With Report of a Case

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THE term, myoclonus, is taken from the Greek and means, literally, "muscle tumult." It is applied to such diverse and different clinical entities as chorea, paramyoclonus multiplex, tic convulsif, myoclonus epilepticus and various forms of hysteria. It is used as a synonym for many motor disturbances because in all of these disorders there occurs a recurrent or continuous spasm of muscles or parts of muscles. Since a similar case has not been reported for fifteen years, I believe that it will be of interest to relate the following case.

Case Report

G. H., white, female, aged four, was admitted to the pediatric department of the Minneapolis General Hospital, on January 9, 1935, with the following history: On August 18, 1934, the child had a generalized convulsion lasting five minutes, with twitching of individual muscles all over the body, but especially involving those of all the extremities and face. There was loss of consciousness lasting for about five minutes from which the child fully recovered. There was no concomitant illness during this first attack. During the next five weeks, similar convulsions occurred with gradually increasing frequency until they appeared daily. The attacks began with a deep gasping breath, coarse tremors of the upper extremities which spread upward to the face and downward to the legs. The patient never bit her tongue nor injured herself in any way.

In the latter part of September, 1934, the patient was put on calcium therapy but with no effect. During

October and November, she was given a ketogenic diet. At this time the muscular convulsions disappeared. This diet was discontinued December 1, 1934, and for the next two weeks the child was well until she developed an upper respiratory infection. Then the convulsions reappeared two and three times weekly until her admission to the Minneapolis General Hospital.

The patient had been delivered by instruments following a normal pregnancy. Her entire life was uneventful until August, 1934, there having been no childhood diseases. There is no history of family degeneracy, epilepsy or chronic diseases.

The little girl was well developed and nourished, and presented no abnormality except constant and coarse tremors present in both upper and lower extremities.

The child was fully conscious and apparently comfortable. The head was bent slightly forward and to the left. The gait was uncertain, halting and jerky because of the constant coarse tremors and contractions of all muscles of the extremities and face. Acute spells occurred about every hour. During such attacks, speech was indistinct. The convulsions lasted from five minutes to two hours. There was a temporary loss of consciousness at the onset, petit mal in character. The movements varied during each attack, rapid at first and gradually slowing down as the twitching terminated. Swallowing and breathing were normal. Occasional enuresis and incontinence was present but only when emotionally aroused as by a visit of the parents. The abdominal reflexes were hyperactive; all others were normal. The muscle tone and strength were good. The coordination tests consisted of movements which, in the first test, brought the index fingers of

both hands together when the eyes were closed. The second test brought the index finger of either hand to the tip of the nose. And the third test brought the heel of one foot to the anterior tibial region of the other leg. These tests could not be performed during an attack because of the tremors but were carried out normally during quiescent intervals. The patient could not write because of the severity of the tremors.

A spinal tap, performed on January 11, 1935, was negative. Starting on January 15, 1935, and continued daily until January 23, 1935, the patient was given gradually increasing doses of triple typhoid vaccine. This treatment had no effect on her tremors, which continued five to ten times daily. On January 29, 1935, the ketogenic diet was ordered consisting of 129 grams fat, 10 grams carbohydrate and 32 grams of protein. Following the initiation of this régime the attacks diminished both in number and severity until they appeared only twice daily. On February 2, 1935, the total fluid intake was limited to approximately 500 c.c. per day, 275 c.c. of this amount being the water content of the food. The attacks gradually decreased. After February 7, 1935, there was none. On February 22, 1935, the patient suffered a generalized muscular contraction starting at 7:00 a. m. and lasting for two hours. After that there were no more attacks during the remainder of her hospitalization (Table I).

TABLE I

Date	Total fluid	No. of attacks daily	Water content of food in diet
2- 2-35	500 c.c.	2	275 c.c.
2- 3-35	500 c.c.	2	275 c.c.
2- 4-35	500 c.c.	1	275 c.c.
2- 5-35	500 c.c.	1	275 c.c.
2- 6-35	500 c.c.	1	275 c.c.
2- 7-35	500 c.c.	None	275 c.c.
2- 8-35	500 c.c.	None	275 c.c.
2- 9-35	550 c.c.	None	275 c.c.
2-10-35	600 c.c.	None	275 c.c.
2-11-35	650 c.c.	None	275 c.c.
2-12-35	700 c.c.	None	275 c.c.
2-13-35	750 c.c.	None	275 c.c.
2-14-35	850 c.c.	None	275 c.c.
2-15-35	1000 c.c.	None	275 c.c.
2-16-35	1200 c.c.	None	275 c.c.
2-17-35	1600 c.c.	None	275 c.c.
2-18-35	2050 c.c.	None	275 c.c.
2-19-35	2450 c.c.	None	Full diet
2-20-35	2500 c.c.	None	Full diet
2-21-35	2500 c.c.	None	Full diet
2-22-35	2500 c.c.	1	Full diet
2-23-35	2500 c.c.	None	Full diet
2-24-35	2600 c.c.	None	Full diet
2-25-35	2600 c.c.	None	Full diet

The fluid intake was gradually increased, starting on February 9, 1935, until the child received unlimited fluids on February 9, at which time the ketogenic diet was replaced by a full diet.

Urine examinations showed traces of albumin on these occasions and acetone and diacetic acid during the administration of the ketogenic diet.

The electrocardiogram, taken on January 10, 1935, showed a negative T2 and T3, suggesting myocardial damage. When repeated on March 1, 1935, the tracing was normal.

X-ray of the heart and esophagram, on January 15, 1935, showed M.L. 5.8, M.R. 2.7, total 8.5, T.T. 15.8. There appeared to be a slight fullness in the region of the pulmonic conus with slight pressure against the esophagus from the region of the left auricle. The appearance suggested the possibility of a mild mitral stenosis. However, I feel that this finding has no relationship to the disease condition for which the patient was hospitalized. The patient was last seen on August 22, 1935, at which time the mother reported that the child had no further attacks and was on an unrestricted diet. Physical examination at this time revealed a systolic murmur over the apex of the heart and transmitted to the axilla. There also was an accentuation of the second pulmonic sound. A second x-ray of the heart and esophagram revealed essentially the same findings as previously reported.

Herpin was believed by many writers to be the first author to describe myoclonus epilepticus. However, he did not do this specifically, but indirectly, in his general description of the interparoxysmal motor disorders of epilepsy. It was not until 1891 that Unverricht published a monograph describing a number of cases, and called it familial myoclonus, several, although not all, members of the family being affected. Since Unverricht's description, the disease has been called myoclonus epilepticus.

Etiology

According to articles written by Clark and Prout, Rowley and Shanahan, the predisposing causes point toward family degeneracy. The incidence of hereditary predisposition is as high as that of essential epilepsy. It may appear in several generations, either as a direct or as a collateral inheritance. Some of the reports expressly state the existence of degeneracy and others merely imply it. The hereditary influences most frequently found are alcoholism, epilepsy and insanity. No one form takes precedence.

Males are more frequently affected than females in the ratio of five to three. All the cases develop under the age of twenty, 75 per cent developing before the thirteenth year.

Symptomatology

In the development of the disease, the phase of epilepsy appears first in half the cases, in

TABLE II

Myoclonus Epilepsy	Paramyoclonus Multiplex	Epilepsy	Chorea	Hysteria
1. Loss of consciousness, petit mal in character.	No loss of consciousness	Loss of consciousness, grand or petit mal in character	No loss of consciousness	Loss of consciousness, not absolute
2. Warning in some cases, auræ	No warning	Warning in some cases, auræ	No warning	The attack often preceded by emotional excitement
3. Pupils dilated	Pupils normal	Pupils dilated	Pupils normal	Pupils normal
4. Clonic spasms and fibrillary twitchings of muscles	Clonic spasms of individual muscles	Tonic and clonic spasms of muscles	Involuntary movements of a muscle or a group of muscles	Tonic rigidity, exaggerated movements, excessive noises
5. Nystagmus-like movement of eyes, but irregular in direction	No nystagmus	Eyes turn inward and upward	No nystagmus	Eyes staring, sometimes closed
6. No involuntary passage of urine or feces	No involuntary passage of urine or feces	Involuntary passage of urine and feces	No involuntary passage of urine and feces	No involuntary passage of urine and feces
7. Slight stupor	No stupor	Prolonged stupor	No stupor	No stupor
8. Duration of attack, 5 minutes to two hours	Duration of attack 30 to 60 minutes	Duration of attack 15 to 30 minutes except in status epilepticus	Muscle activity constant	Attacks may or may not be frequently repeated.
9. Mentality subnormal later in disease	Mentality normal	Mentality subnormal	Mentality normal or above normal	Mentality normal or above normal
10. Occurs more often in childhood	Occurs more often in adult life	May occur any time	Occurs in childhood	Occurs in adult life
11. Heredity a factor	No hereditary factors	Heredity a factor	Heredity may or may not be a factor	No hereditary factors

periods ranging from weeks to months. In one-third, myoclonus predominates and in the remainder the two appear simultaneously. The disease first manifests itself with attacks of nocturnal epilepsy which may be either grand mal or petit mal in character. Later in the disease, the epilepsy may become diurnal. These seizures may continue throughout life or disappear completely after a few years. They are not typical, in that no aura exists, tongue biting is infrequent and post-epileptic coma never appears. In many cases, consciousness is only partially lost during a seizure.

The myoclonic contractions may be fibrillar or may involve muscle groups, causing locomotor effects. The movements are rapid in nature. The regions involved in order of frequency are: the upper extremity, lower extremity, chest, abdomen, neck and face. Both sides are usually affected, but the movements are not synchronous.

The tongue, diaphragm and also the pharyngeal muscles are frequently involved, causing difficulty in swallowing, explosive speech, and a grunting expiration. In the early stages the convulsive movements occur only during voluntary movements and they appear as exaggerated purposeful acts. In the worst forms the muscular strength suffers a marked diminution, and muscular atrophy may occur as a consequence. The strength, extent and frequency of these muscular contractions vary from day to day. Some days the patient may be almost free from any convulsions; other days the attacks may be more frequent. It is rare for the child to be entirely free from evidence of myoclonus.

As a general rule, both the superficial and deep reflexes show considerable hyperirritability. There is lack of physical development, owing to the difficulty in swallowing, which causes malnutrition, anemia and gastro-intestinal symptoms.

Pathology

Clark and Prout believe that the disease is due to an essential defect in cortical control, having found evidence of a meningitis with round cell infiltration of the pia in the region near the blood vessels, a destruction of the internuclear network of the second cortical layer and destruction of the pyramidal cells of the third layer. Williams reported lymphocytic infiltration of the meninges over the paracentral convolutions and extensive infiltration of red cells and lymphocytes in the pia of the cord.

Unverricht suggested that the disease was due to degeneracy of the motor ganglia of the cord brought on by excessive stimulation of an unknown cause. Most investigators agree with this theory because, according to present-day views of cortical representation, this is certainly to be suspected. Coördinated muscular movements, group movements of muscles acting in unison, are represented in the brain cortex, rather than movements of individual muscles which have their representation in the anterior horn cells of the cord. Burr, who examined the brain and spinal cord of one patient, said he could not demonstrate any morbid changes either in the cells of the motor cortex or in the anterior horn cells of the spinal cord.

Diagnosis

The outstanding diseases that require differentiation from myoclonus epilepticus are paramyoclonus multiplex of Fredrick, epilepsy, chorea and hysteria (Table II).

In myoclonus epilepticus the loss of consciousness is petit mal in character, while in the other conditions mentioned, except epilepsy, there is no loss of consciousness. In some cases auræ precede attacks of myoclonus epilepsy and epilepsy. Hysteria also may be preceded by attacks of emotional excitement. In chorea and paramyoclonus multiplex of Frederick there are no warnings. In patients having attacks of myoclonus epilepticus and epilepsy, the pupils are dilated but are normal in the other three conditions. In myoclonus epilepsy there is both clonic spasm and fibrillary twitching of muscles. In the other four diseases there are only contractions of whole muscles. Nystagmus-like movements of the eyes are present in myoclonus epilepsy, but are not present in the other diseases. When a

stupor occurs after an attack of myoclonus epilepsy, however, it is of shorter duration than that after an epileptic seizure. In the remaining three diseases no stupor occurs. The duration of an acute attack of myoclonus epilepsy varies from five minutes to several hours. In epilepsy the seizure is of short duration. The activity of chorea is constant. Patients suffering from myoclonus epilepsy and epilepsy have subnormal mentality. In chorea, hysteria and paramyoclonus multiplex the mentality is normal or above normal. Myoclonus epilepsy starts most frequently in childhood while paramyoclonus multiplex appears in adult life. Epilepsy may occur at any time from childhood on. Heredity is a factor in both epilepsy and myoclonus epilepticus; it is questionable in chorea and is negligible in paramyoclonus epilepsy and hysteria. Myoclonus epilepticus and epilepsy are closely associated but myoclonic movements occur but rarely in association with epilepsy. Turner found only two cases among 2,000 epileptics while Shanahan reported seven cases in 2,150 cases of epilepsy. In both these series the myoclonus appeared before the epileptic seizures.

Prognosis

In all the cases reported the prognosis is invariably bad. No cases on record have recovered although long remissions may occur. Patients usually die in early adult life.

Treatment

The treatment of myoclonus epilepticus has been and still is unsatisfactory because of the unknown etiology of the disease. The treatment in this case consisted first of a ketogenic diet, and later of a reduction in the amount of fluid intake.

Inasmuch as myoclonus epilepticus has long periods of remissions the true value of this treatment is as yet uncertain. It will only be by long continued observation that its true value will be determined.

Comment

Although the diagnosis is certain, the patient reported differs in some ways from previous cases reported. There is no history of epilepsy in the family nor any type of family degeneracy. Although a cure cannot be claimed, the symp-

toms, especially the muscular contractions, were allayed by the reduced water intake and a ketogenic diet.

The author wishes to express his appreciation to Dr. Max Seham, for his aid in the preparation of this article.

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CASE REPORT

MUCOCELE OF THE APPENDIX

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J. C., a farmer fifty-three years of age, was admitted to the hospital on January 2, 1936. He had been in good health except for an attack of appendicitis twelve years ago, from which he recovered in a day or two. From time to time since he has had similar attacks which usually lasted for a day or two and were sometimes accompanied by nausea or vomiting. His bowels have been regular.

On January 1, 1936, he developed pain in his lower right abdomen similar to the pain he had experienced in previous attacks. When he came to the hospital he had a leukocytosis of 17,000, temperature 99 and pulse 80. He was tender over McBurney's point with one plus muscle spasm. There was no rebound tenderness and no distention of the abdomen. He did not vomit, but felt nauseated. The day he entered the hospital his bowels moved normally. A diagnosis of appendicitis was made and an operation advised.

Under gas anesthesia the abdomen was explored through a right rectus incision. The gallbladder and stomach were found to be normal. A tumor of the appendix, freely movable, was found at the brim of the pelvis on the right side. This proved to be a mucocele of the appendix. The tumor occupied the distal portion of the appendix; the proximal portion appeared normal. There was no free fluid in the abdomen. There was no macroscopic evidence of acute inflammation of either the tumor or the appendix. The meso-appendix was very much thickened and edematous.

Pathologic report.—Appendix was 10 cm. in length. At the distal end there was a cystic tumor measuring 5 cm. in diameter filled with a thick, clay colored homogeneous substance, apparently sterile. There was

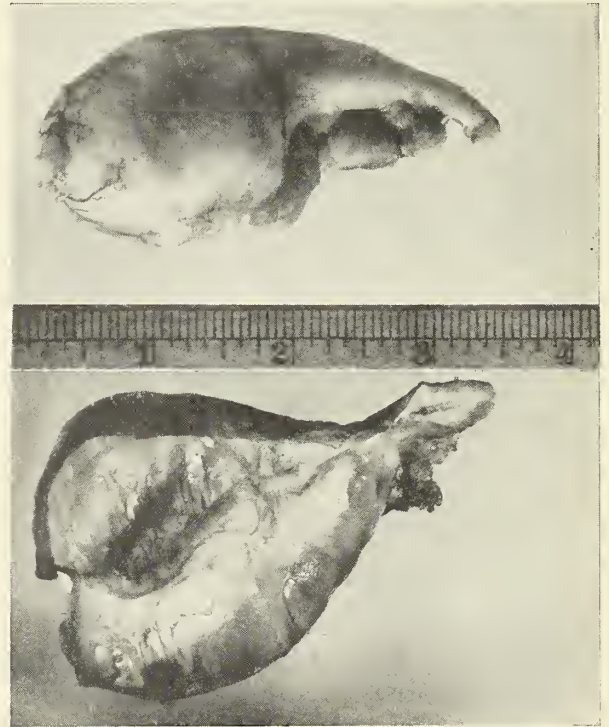


Fig. 1.

no macroscopic evidence of inflammation in the cyst wall. The proximal portion of the appendix was normal in size; its lumen was completely obliterated by dense, fibrous, connective tissue. Sections of the cyst wall showed necrosis of the inner surface with inflammatory reaction and presence of giant cells. There was no definite tubercle formation but these giant cells were suggestive of tuberculosis. There was no evidence of malignancy.

The accompany photographs (Fig. 1) give an idea of the size of the mucocele.

CLINICAL PATHOLOGIC SEMINAR*

Conducted by E. T. BELL, M.D.

Department of Pathology, University of Minnesota

Minneapolis

Carcinoma of the Esophagus

Case 5.—A woman, fifty-four years old, was admitted to hospital on October 7, 1935, complaining principally of a severe cough. The cough had its onset about August 1, 1935, and was from the first associated with the raising of considerable foul sputum and with some substernal pain. She felt that at the time of onset she "was not suffering from a cold" but that she might have had some fever. She came to the outpatient department on August 19, complaining of "bronchitis" and some difficulty in swallowing; she said that "things seemed to stick in her throat." She attributed the difficulty to an enlarged thyroid and took iodine to reduce its size.

The positive findings noted were an adenomatous thyroid with x-ray evidence of tracheal pressure from the right without compression; x-ray enlargement of the left ventricle of the heart; lung fields clear. Wassermann and Kahn tests gave negative findings; basal metabolic rate was +21 per cent. At the patient's last visit to the outpatient department hospitalization was advised for study of the thyroid.

The cough persisted until she was admitted to the hospital on October 7 and was nearly always associated with the raising of very foul sputum. It had been present both day and night and had interfered with sleep. The position of the body did not seem to affect the cough, but it was definitely aggravated by the taking of food and liquid. On this account she had eaten very little during the month previous to admission. She estimated that she had raised a quarter of a pint of very foul brownish liquid sputum daily; occasionally blood streaking had been noted. In addition to voluntarily diminished food intake, she had suffered definite loss of appetite since the onset of the symptoms and there had been loss of weight. She had been up and about until the week before admission; since then she had been confined to bed. There was cholecystectomy in 1927.

The temperature on admission was 100°; pulse 105; respirations 24; blood pressure 120/86. She was well developed and well nourished. Except for occasional spells of coughing she was lying quietly. Her breath was very foul and her throat slightly inflamed. There was moderate dullness in the right chest from the second dorsal spine to the base. Breath sounds and tactile fremitus were diminished over the same area. Coarse râles were present. No other positive findings were noted.

The urine was normal. Hemoglobin was 75 per cent; leukocytes 15,450. The sputum contained occult blood and pus; elastic fibers were found on two occasions; in stained preparations yeast cells were found, associated with a branching mycelium. Cultural studies showed the organism to be *Oidium albicans*. X-ray of the chest showed uniform increase in density of the middle portion of the right upper lobe, with a suggestion of some changes in the lower lobe as well.

She continued to cough up very foul smelling sputum, gradually grew weaker and died on October 12, the sixth day of hospital residence.

The clinical impression was abscess of the lung or empyema in communication with a bronchus.

The postmortem examination showed a well nourished woman. The principal lesions were (1) carcino-

ma of the esophagus of annular form and about 8 cm. in length; the lower end was situated 10 cm. above the cardia; there was a large perforation of the carcinoma on the right side where it communicated with an abscess in the lower lobe of the right lung. The abscess was filled with gangrenous purulent material and communicated with the adjacent bronchus. The right lung weighed 760 grams and showed an extensive bronchopneumonia throughout the lower lobe and in the posterior parts of the middle and upper lobes; less extensive bronchopneumonia was present in the greater part of the left lung. The carcinoma was of the usual squamous cell variety.

Comment: An examination of the esophagus would have revealed the true nature of the lesion. On the basis of the available clinical data a diagnosis of empyema or abscess of the lung communicating with the bronchus, or a carcinoma of the esophagus communicating with the bronchus, was indicated.

Carcinoma of the Bronchus

Case 6.—A man, sixty-nine years of age, noted about January, 1931, a pimple on his right temple. During the next two years this was pricked several times by his barber on the assumption that it was an ingrowing hair. It kept enlarging and in January, 1933, was excised by a surgeon. Microscopic diagnosis was squamous cell carcinoma, grade 2. Postoperative radiation was given.

On April 26, 1934, the patient was admitted to hospital with complaint of recurrence at the site of the original tumor and lumps on the right side of the neck. Examination showed a cluster of papillary lesions 1.5 x 5 cm. on the right temple and several palpable nodes in the right side of the neck. Examination otherwise gave essentially negative findings.

Previous history was unimportant except for the lesion on the right temple and removal of a bladder stone in 1923. Blood pressure was 176/104. Urinalysis findings were negative. Hemoglobin was 96 per cent; white blood cells 6,950 with normal differential; Wassermann negative; temperature normal. Weight 180 pounds. X-ray of chest showed left pleuropericardial adhesions, two small calcified areas in the left lung and no evidence of metastatic tumor.

Twenty-seven mc. of radium emanation was implanted in the temporal lesion and the cervical nodes; the patient was seen at frequent intervals. Decrease in size of both primary tumor and cervical nodes was noted, along with radium reactions; on July 5, 1934, it was noted that "primary and metastases are well healed; no radium reaction." On October 11, 1934, it was noted that there were a few small nodules in the neck, probably gold seeds.

On January 21, 1935, the patient complained of a slightly painful mass of one week's duration in the left axilla; examination showed a node of 1.5 cm. in diameter. The neck was as before. The new node was interpreted as a metastasis from the temple and 10 mc. radon was implanted. Another plate of the chest was made with the same findings as before. Hemoglobin at this time was 84 per cent; white cells 9,400 with normal differential. Urinalysis gave negative findings. By February 28, 1935, the axillary node had shrunk to 5 mm. in diameter.

*Continued from the April issue.

On March 29 the patient complained of a severe cough for three weeks. He was given cough medicine but, as this did not give relief, another x-ray of the chest was taken on May 7. In addition to the previous findings this showed a marked increase in the bronchovascular markings of both lower lobes, interpreted as a lower respiratory infection; no evidence of metastatic tumor. On May 31 the patient was given more cough medicine.

On June 14 he saw a private physician who, because of dyspnea and altered breath sounds, diagnosed collapse of the left lung from obstruction of the bronchus by tumor. The cough continued and difficulty in speech developed which was diagnosed as due to involvement of the left recurrent laryngeal nerve by tumor metastases. Death occurred on August 22, 1935; weight at death about 120 pounds.

The principal postmortem findings were as follows: a decubital ulcer 2 cm. in diameter over the sacrum; pericardial cavity obliterated by old adhesions; small tumor nodules in the left side of the pericardium. The heart weighed 350 grams; valves normal. The left lung weighed 1,000 grams and showed a carcinoma arising at the point of division of the left main bronchus, completely filling some of the secondary bronchi; numerous tumor nodules up to 1.5 cm. in diameter were scattered throughout the lung. The left bronchial lymphnodes were enlarged and filled with tumor. There were numerous abscesses throughout the lung. The left recurrent laryngeal nerve was surrounded and invaded by tumor. There were numerous tumor metastases in the liver up to a diameter of 2 cm. In the middle of the descending colon was a tumor mass 3 cm. in diameter which invaded the lumen from without and did not produce ulceration of the mucosa. There was a small metastasis in the left adrenal. There were metastatic tumor masses in the lymphnodes at the root of the neck and in the left axilla.

Microscopic examination of all the various tumors showed a carcinoma of the squamous cell type with very little cornification. The position of the growth in the left bronchus indicated clearly that this was the site of the primary tumor. There was no evidence of metastases from the original tumor in the right temple. The final diagnoses were: bronchogenic carcinoma of the left main bronchus with metastases to the mediastinal lymph nodes, the right lung, the liver, the glands at the root of the neck and in the left axilla, the left adrenal and the descending colon; bronchiectasis and abscesses of the left lung; pericardial adhesions; involvement of the left recurrent laryngeal nerve by tumor.

Comment: The original carcinoma in the right temple gave rise to the clinical impression that the involvement of the lymphnodes and the lung was due to metastases from the carcinoma of the temple. However, the postmortem examination revealed that the symptoms were due to another carcinoma originating in the bronchus.

Primary Hypertension

Case 7.—The case is that of a man forty-three years old. In September, 1934, it was discovered that he had hypertension, ranging to 230 mm. of mercury. He was seen by a physician on December 12 when he was having dyspnea on exertion, one attack coming on at night and lasting several hours. He had had slight edema of the ankles previous to December. His blood pressure was 204 to 210 systolic, 144 diastolic. There was marked edema of the ankles. The heart was normal; rhythm was regular but there was a sharp aortic second sound. The eyegrounds showed tortuosity of the vessels, interrupted arterioles and arteriovenous compression.

Red blood cells showed 5,080,000; hemoglobin was 88 per cent; white cells 8,000. Intravenous phenolsulphonephthalein showed 51 per cent return at the end of two hours. Urinalysis on single specimens showed a concentration of 1.026; albumin ++ to ++++. Basal metabolic rate was -7. Electrocardiographic tracing showed a diphaseic T in lead 1 and negative T in 2 and 3. Fluoroscopic examination of the chest in December showed the heart to be within normal limits.

On June 24, 1935, the patient was seen again. At this time he complained of marked precordial distress, coming on following exertion. He continued to do his usual work, which was rather strenuous. Electrocardiographic tracings now showed upright T in lead 1, diphaseic T in lead 2 and negative T in lead 3. At this time the heart was found to be markedly enlarged to both left and right. He had some symptoms of pressure on the esophagus.

He was admitted to hospital September 2 on account of severe dyspnea on exertion. He was unable to continue his work. He had a tendency to Cheyne-Stokes respiration at night and developed moderate nausea and vomiting; edema of the ankles became worse and there was heavy albuminuria. Blood pressure was 220/160. He was nervous and restless but remained rational. The liver edge was 5 cm. below the costal margin. Another urinalysis showed albumin ++++; specific gravity 1.025 with numerous hyaline and granular casts. Urea nitrogen was 23.8 mg. Phenolsulphonephthalein showed 49 per cent after two hours. Blood culture gave negative findings. He was given digitalis to complete digitalization without response; the edema increased in spite of medication and rest; he became very restless; vomited at times and shortly before death became almost maniacal.

The spinal fluid was under moderate pressure. The patient went into coma. On September 27 the urea nitrogen was 92.4 mg.; uric acid 8.8 mg.; creatinin 2.43 mg.; van Slyke 44 per cent. He grew progressively worse and died September 28.

His mother is living and well at the age of seventy-eight; his father died at sixty-one of a stroke; four brothers are living and well.

The principal postmortem findings are as follows: No ascites or hydrothorax. Heart 650 grams; transverse measurement 17 cm.; marked hypertrophy and dilation of the left ventricle; also hypertrophy and dilation of the right ventricle and the right atrium; an accessory mitral valve was present but the atrial valve was apparently competent; the coronary arteries showed only moderate atheroma; no narrowing; no thrombosis; arteriosclerosis of the aorta grade 1 to 2. There was very marked edema and congestion of both lungs, weighing 950 grams and 900 grams; no bronchopneumonia; no disease of the pulmonary arteries; marked chronic passive congestion of the spleen; extreme chronic passive congestion of the liver with extensive atrophy and necrosis of the centers of the lobules. Kidneys weighed 180 grams and 170 grams; surfaces finely pitted. Microscopically there was moderate atrophy due to intimal thickening of the small arteries and arterioles; the changes were such as are found in so-called malignant hypertension but had not progressed to a degree sufficient to cause marked renal insufficiency.

The diagnosis was primary hypertension with hypertrophy and dilation of the heart, edema of the lungs, severe chronic passive congestion of the viscera and moderate atrophy of the kidneys.

Comment: This is a case of primary hypertension in which death was due chiefly to chronic myocardial exhaustion. The sclerosis of the renal arteries and arterioles was also prominent and sufficient to cause some decrease in renal function.

Astrocytoma

Case 8.—A woman, thirty-six years of age, was admitted to the hospital February 6, 1936, and expired February 25 after a stay of nineteen days. She was apparently well until 1933, when she noticed for the first time a slight clumsiness and weakness of the left lower extremity. The weakness grew progressively worse until she had difficulty in walking and was confined to a wheelchair and later to bed. In 1934 she noticed similar involvement of the left upper extremity. The right side of the body was apparently not involved. The involvement of the left side continued to increase. There were no other complaints until August, 1935, when she first began to suffer from headaches, which were localized mostly on the right side and in the temporal region. These grew progressively worse and were constant. At about the same time she developed some dizziness.

At the time of admission she was incontinent and unable to walk at all. She was fairly well developed. The general examination was negative. There was left homonymous hemianopsia and bilateral choked disc. The left pupil was irregular, reacted poorly to light and was somewhat larger than the right pupil. There was supranuclear involvement of the left facial nerve. The patient complained of hypersensitivity to pain and touch of the entire right side of the body and decreased sensibility on the left side. The deep reflexes were all increased. There was left ankle clonus and left positive Babinski sign. The abdominal reflex on the left side was not obtained. There was marked weakness in the left upper and lower extremities; the limbs on the right side were normal. Deep sensation was intact.

X-ray examination of the skull revealed complete destruction of the dorsum sella and the posterior clinoid processes. The anterior clinoids were deformed. There was no depression in the floor of the sella.

Urine examination gave negative findings. Hemoglobin was 100 per cent, white cells 10,000. The clinical impression was that of a tumor in the region of the right thalamus extending laterally to involve the right internal capsule, thereby accounting for the left hemiparesis and decreased sensibility of the left side. The tumor evidently must be large enough to obliterate the third ventricle and compress the thalamus on the left side, accounting thereby for the hyperesthesia on the right. An attempt was made to verify this clinical localization by means of ventriculography; a ventriculogram showed a fairly marked hydrocephalus of both lateral ventricles. The third ventricle, aqueduct and fourth ventricle were not visualized. There was some elevation of the floor of both lateral ventricles just posterior to the junction of the frontal horn and the body. The picture was characteristic of a tumor of the base of the brain obliterating the third ventricle and elevating the floor of the lateral ventricles, thereby adhering quite closely to the clinical impression.

At the time of the ventriculographic studies the patient's condition was very poor. She had rapidly gone down hill and had weakened perceptibly. She reacted unfavorably to the ventriculographic studies. Her temperature rose to 103°; pulse became rapid and she expired on the following day.

The autopsy was limited to the head. A large tumor 6.5 x 7 cm. was found at the base of the brain, somewhat more on the right than on the left side; it was fairly well circumscribed. It replaced a large part of the right thalamus and the posterior limb of the right internal capsule. It obliterated the third ventricle and compressed the left thalamus. The sylvian aqueduct was closed by the tumor. The left optic tract was partly compressed but could still be made out. Other cranial nerves were not involved.

Microscopic diagnosis: astrocytoma. This is the least malignant form of glioma.

THROMBOPLASTIC SUBSTANCES: THROMBOPLASTIN SOLUTION-ARMOUR OMITTED FROM N. N. R.

Late in 1934 information was received by the Council on Pharmacy and Chemistry concerning an untoward incident in a large eastern hospital. During the past four years there were observed in the institution referred to four cases of *B. Welchii* and three cases of *B. tetani* postoperative infections. The occurrence caused a thorough reinvestigation of all the surgical procedures of the institution. Nevertheless, a postoperative infection appeared from time to time. Late in 1934, according to the statement made to the Council, it seemed advisable to take a culture of Thromboplastin-Armour which had been used in the prevention of postoperative bleeding. To the surprise of the investigator the Thromboplastin was found to contain *B. subtilis*, *Staphylococcus aureus*, *B. proteus*, *enterococcus* and *B. Welchii*. As a result of this incident, a bacteriologic examination of samples of commercial thromboplastic preparations was made for the Council. Of the seven preparations examined the following were found sterile: Thromboplastin Local (Lederle), Fibrinogen, Local and Oral (Merrell), Hemostatic Serum (Lapenta) (P. D. & Co.), Thromboplastin Local and Hypodermic (Squibb), and Coagulen (Ciba). Examination of Thromboplastin Local-U. S. Standard Prod-

ucts Co., the package of which had been previously opened, revealed aerobic, spore-bearing bacilli. Six specimens of Thromboplastin Solution-Armour were examined and all found to contain numerous bacteria, chiefly spore-bearing aerobes and anaerobes. Streptococci and diphtheroids were found in some, and an organism closely resembling *B. Welchii* found in five of the six samples. In view of this report the Council voted to omit Thromboplastin Solution-Armour from New and Non-official Remedies until satisfactory assurance is given that its manufacture is conducted under such conditions as to preclude the danger of contamination, and until such time as a number of specimens found on the market shall have been found to be sterile. The Council voted further that all manufacturers of accepted thromboplastic substances be requested to submit evidence of the sterility of their respective products and that no thromboplastic substance be accepted for New and Non-official Remedies until satisfactory evidence is given that the preparation is sterile. When the Council's report was sent to Armour & Co., the firm promptly replied stating that it had confirmed the findings of the Council. It immediately withdrew Thromboplastin Solution-Armour from the market and has stated that it will not promote the product in the future. The Council commends Armour & Co. for the prompt action it has taken. (J. A. M. A., May 18, 1935, p. 1824.)

EDITORIAL

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Annual Meeting

AS we go to press, the annual meeting of our State Medical Association is in the offing. Except for the occasional meeting within our state borders of a national medical association, our annual get-together is the largest and most important meeting of the year.

The tentative program published in our April number will be carried out except for a few minor changes necessitated by illness or other unforeseen circumstances.

This year the unusual clinical facilities offered by the Mayo Clinic will be utilized the first two hours each day. Operative clinics will be held at St. Mary's Hospital, surgical dry clinics in the nurses' lecture room in the hospital and medical clinics in the auditorium of the nurses' home which adjoins the hospital.

A half hour in the mid-morning and mid-afternoon has been set aside for scientific ex-

hibits and demonstrations, a growing feature of our meetings in recent years.

Eminent guests will appear on the program the last hour each morning and the first hour each afternoon. While the guest speakers are fewer in number than last year, their national and even international reputations should prove an attraction.

Members of the Association and the Women's Auxiliary will gather Monday evening at the Methodist Church to hear Dr. W. W. Will, president of the State Medical Association, and Mrs. E. M. Hammes, president-elect of the Auxiliary. We shall also have the opportunity to hear Dr. William J. Mayo and our popular national secretary, Dr. Olin West, on this occasion.

Tuesday evening the ladies will be entertained by Mrs. W. J. Mayo while the doctors will assemble at the Armory for the "Open House" extended by members of the Dodge County Society. On this occasion the exhibit on crime detection methods by the Federal Bureau of Investigation of the United States Department of Justice will be explained by the Bureau's "G" men. If you have visited enough exhibitors' booths and had your ticket punched, you will be eligible at this meeting for the drawing for prizes offered by exhibitors.

The annual meeting will be brought to a close Wednesday afternoon with the Medical Question Court. Dr. W. A. O'Brien, assisted by a group of specialists, will again preside, and last year's success will doubtless be duplicated.

Insulin and Heart Symptoms

ATTENTION has been repeatedly called to the need of caution in the use of insulin in elderly diabetic patients. There have been numerous reports of the appearance of angina pectoris, auricular fibrillation, electrocardiographic changes and even coronary thrombosis, following the use of insulin. The question has been raised whether these symptoms may not be due to the production of a hypoglycemia rather than simply to the use of insulin.

Diabetes predisposes to the development of arteriosclerosis of all the arteries, the coronaries included. The heart in diabetes therefore frequently presents symptoms associated with anoxemia. Glucose is essential to muscle function whether it be of skeletal or heart muscle. The thought has been expressed that the heart muscle becomes accustomed to a rich supply of glucose in the uncontrolled diabetic patient and that a reduction in the blood sugar from the use of insulin accounts for the appearance of heart symptoms. On the other hand, insulin enables the organism to store glycogen in the muscles as well as the liver. It should have a favorable effect on the heart in diabetes.

Certain authors* have recently expressed the opinion, derived from clinical experience, that the factor which accounts for heart symptoms in diabetic patients following the use of insulin, is the production of hypoglycemia and not simply the use of insulin. Their experience convinces them that insulin properly used not only does not produce anginal symptoms, but may even cause heart symptoms to disappear when already present. Their practice is to place their elderly diabetic patients on a fairly high carbohydrate diet (at least three grams per kilo of body weight) and gradually increase the dose of insulin until the sugar disappears or nearly disappears from the urine, not using the blood sugar as a control. In order to prevent the occurrence of a hypoglycemia fifteen grams of carbohydrate in the form of fruit juice is given two hours after each dose of insulin, at which time the insulin action is at its height. The contention of these authors is worth noting.

Nursing Problems

NO one appreciates the value to the patient of an efficient trained nurse more than the doctor. The nurse's part in restoring a patient to health is usually more tedious than the doctor's, and "the laborer is worthy of his hire."

The same law of supply and demand, however, affects the profession of nursing as it does other professions and business in general.

*Collens, U. S., Stoliarsky, R. B., and Netzer, S.: Is the use of insulin indicated in the elderly diabetic with coronary sclerosis? *Am. Jour. Med. Sci.*, 191:503, (April) 1936.

If the fee of the trained nurse in any locality is high enough to place her services in the nature of a luxury so far as the ability of the public to pay is concerned, her services will go begging and the nursing profession will suffer.

The question of how much preliminary education and how many years of training are essential for nursing, has received various answers. Is it not possible to demand more preparation of a young woman before she is entitled to be an R.N. than the returns may justify? Might it not come to pass that certain types of bedside nursing may come more and more to be handled by nurses with less training and at a lower wage? Already the practical nurse has found a place for herself, and her field has been widened by recent economic conditions. In one Duluth hospital has appeared the nurse's aid—a young woman in uniform who at a small wage assists at nursing, eats in the hospital, but lives outside.

A year or so ago it was not uncommon for registries in the larger centers in Minnesota to have literally hundreds of nurses awaiting work at one time. There are about half the training schools in the state now that there were a few years ago. Some schools were purposely discontinued in order to reduce the supply of nurses. Others were discontinued of necessity because the rigid requirements for schools could not be met for practical and financial reasons. Some of these hospitals depend entirely on graduate nurses for floor care. The effect of this reduction in the number of schools can scarcely as yet have been felt. With the present increase in the employment of nurses, due to a definite improvement in economic conditions, and the many temporary government positions open to nurses, there is some evidence of a dearth of nurses at present.

The nursing profession is faced with important problems. Nurses, hospital executives and doctors are all concerned in the same activity—the care of the sick—and coöperation between these groups is desirable. That the desire to co-operate exists was shown at a recent meeting of the interprofessional committee representing these three groups. These meetings afford an opportunity for the discussion of common problems and these discussions should be of advantage to all three groups.

Millard Memorial

FOR nearly forty years unidentified, the grave of Dr. Perry H. Millard, first dean of the University of Minnesota Medical School, is to be fittingly marked in June.

Dr. Millard was a pioneer in medicine in Minnesota and was largely responsible for the development of higher medical education and the establishment of the University Medical School. While Millard Hall stands on the University campus as a lasting memorial to his work, his grave in Fairview Cemetery at Stillwater remains sunken in and unmarked.

This neglect is to end this year. A monument is to be erected on his grave with suitable dedication ceremonies by medical leaders of the state. A committee of the Minnesota State Medical Association appointed in 1930, acting with Medical School alumni, has collected the necessary funds and made all arrangements.

June 7, 2:30 p. m., has been set as the date for the ceremonies and Dr. J. T. Christison of Saint Paul is to give the principal address. There will also be talks by Dr. W. J. Mayo, Rochester, regent of the University of Minnesota; Dr. E. P. Lyon, Minneapolis, Dean of the Medical School; Dr. Guy S. Ford, Minneapolis, Dean of the Graduate School; and Dr. E. A. Meyerding, Saint Paul, Secretary of the Minnesota State Medical Association. Dr. Adam H. Smith, president of the Medical Alumni Association, will be master of ceremonies. Dr. H. S. Diehl, Dean of Medical Sciences, will be present. The entire faculty of the Medical School, as well as the student body, will be invited to attend the ceremony with alumni and members of the Medical Association.

The committee in charge includes Dr. E. S. Boleyn, Stillwater; Dr. W. F. Braasch, Rochester; Dr. J. T. Christison, Saint Paul; Dr. F. A. Erb, Minneapolis; Dr. N. O. Pearce, Minneapolis; Dr. F. J. Savage, Saint Paul; Dr. E. L. Tuohy, Duluth; Dr. C. J. Ehrenberg, Minneapolis; and Dr. E. A. Meyerding, Saint Paul. Dr. C. B. Wright, Minneapolis, as trustee of the American Medical Association, represents that organization on the committee. The late Dr. C. N. McCloud was also a member of the original committee.

Dr. Millard was born in New York in 1848. He came to Stillwater in 1872 and moved to Saint Paul in 1887. Following his death in Baltimore in 1897, his body was brought back to Minnesota, to be buried in Fairview Cemetery. Memorial services were held at the Peoples Church, Saint Paul.

Dr. Millard was first dean of the Medical School, a position he held from 1888 until his death. It was he who was largely responsible for the organization and development of the Medical School and he was the author of most of the laws governing medicine in Minnesota.

During the fifteen year period prior to the 1880's, seven medical schools were created in Minnesota. In

1882 Dr. Millard turned his attention to the situation. Far too wise to approach the matter directly by trying to turn these into one school or creating still another school, he began action in another way.



DR. PERRY H. MILLARD

He discovered a constitutional provision under the State Constitution of 1853 which permitted the Board of Regents to create a department of medicine without teaching functions, but to exercise purely examining powers over graduates of any college. Such a department was created in 1883 with Dr. Charles N. Hewitt of Red Wing as president and Dr. Millard as secretary.

The Legislature of 1883 was induced to pass the First Act to Regulate the Practice of Medicine in the State of Minnesota, requiring all physicians to be licensed, and the Department of Medicine was the examining board. Regulations for recognized medical schools were immediately adopted and forms for examinations established. The Department gradually made its influence felt over the private medical colleges. It stimulated teaching and lifted standards.

But it took six years to bring the private schools to recognition of the necessity for unified medical control. In 1888 they united to create the new Department of Medicine legalized by the Legislature of 1887. However, it was not until 1908, after the death of Dr. Millard, that his work reached its culmination and the last of the private medical colleges was united with the University.

Dr. Millard was named dean of the new department, which included dentistry and pharmacy. In 1894, under his administration, the requirement of a three-year

course was changed to four years, and the six-months yearly semester was lengthened to eight months in 1890. In 1893, a loan of \$65,000 from Dr. Millard made possible the construction of the old Millard Hall and the old chemistry building. In 1895 the laboratory of Medical Science was added.

Dr. A. C. Heath of Stillwater, his assistant during those years, has this to say of Dr. Millard and his work:

"Perry H. Millard stands out as the one person with a determined purpose to build a competent medical college of the first rank at the University of Minnesota. Petty factionalisms were much in evidence but never shook him from that purpose. Very fortunate was the University in having Dean Millard in that formative period. He was a determined and courageous executive; with high ideals of medical teaching. Results and progress were always his deciding factors. He felt that the University of Minnesota Medical School was much greater than any man or group of men. The University of Minnesota should indeed be thankful to Dean Millard."

Dr. Millard was also interested in medical organization. He practiced medicine for several years in Stillwater and was instrumental in forming the original Washington County Medical Society. This society was organized in 1882 about ten days before the American Medical Association was scheduled to hold its annual meeting in Saint Paul, and was undoubtedly formed with a view to inviting the American Medical Association to Stillwater.

The invitation was accepted and the feature of the expedition, which was reported at length in the Stillwater paper of the day, was an excursion trip up the St. Croix river from Stillwater. After the river trip, the delegates were guests at the home of Senator D. M. Sabin. Dr. Millard acted as chairman of the meeting which followed the reception.

Dr. Millard was most active at meetings of this early organization. Records show that in 1884 he declared before the society that "influenza" was due to a micro-organism. This observation was based on the results of twelve years of practice. Others reported at the same meeting that they believed the disease due to atmospheric conditions. In the same year, Dr. Millard read a paper on "mastitis," stating that catching cold had nothing to do with it but that lactation and childbirth probably had most to do with it. At another meeting during the discussion on "the inflammation of the spinal cord," Dr. Millard stated that absence of the tendon reflex was diagnostic of traumatic meningitis.

In addition to the monument at Fairview Cemetery, a suitable plaque is to be placed at the University, and surplus funds collected for the memorial are to be turned into the general fund of the Medical Alumni Association.

OBITUARY

Harry Cannon

1872-1936

DR. Harry Cannon, former state senator of the forty-first district in St. Paul, died in San Diego, California, March 23, 1936.

Born in Juneau county, Wisconsin, sixty-three years ago, he was reared on an Iowa farm, worked in a logging camp and two winters in a railroad round-house at Albert Lea.

These efforts enabled him to save enough money to be graduated from Cedar Valley seminary at Osage, Iowa, and begin teaching. He was later principal of schools at Raymond, South Dakota, and Anaconda, Montana.

He then studied medicine and was graduated from the medical school of Washington university, St. Louis, in 1904 and came to St. Paul a year later and began his practice.

He retired from practice a short time ago and went to California to live.

Dr. Cannon had planned to return to St. Paul in May and live at St. Joseph's hospital, where he was once a staff physician.

Dr. Cannon joined the Ramsey County Medical Society in 1906, but discontinued his membership in 1931.

Surviving him are six sisters, Mrs. M. A. Montague of Minneapolis; Mrs. P. M. Daly of Washington, D. C.; Mrs. Thomas Geraghty of San Francisco; Mrs. J. J. O'Reilly of Denver, and Miss Kate Cannon of Tacoma. Two brothers, George of Wyoming and James of Ottawa, Ill., also survive.

Charles Leissring Sommers, Jr.

1910-1936

CHARLES L. SOMMERS, JR., son of Mr. and Mrs. Charles L. Sommers of Saint Paul, was born in Saint Paul in 1910.

He attended the Saint Paul Academy country day school from which he was graduated cum laude in 1927, having been active in extracurricular activities as editor of the school paper and member of the student council. He received his B.A. from Harvard in 1931 and then entered Johns Hopkins medical school, from which he graduated in 1935. His rank as fourteenth in the National Board Examinations last spring, is indicative of his student qualities.

Dr. Sommers had his plans made to take further postgraduate work at the University of Minnesota medical school this spring, a year in pathology and a second year in internal medicine, when his career was tragically cut short on April 8, at the age of twenty-six. Taken ill with a sinus infection and bronchitis in February, he developed a heart affection which terminated fatally in six weeks.

Dr. Sommers received the esteem and love of his fellow students for his keen intellect and sense of humor, and this popularity was well attested by the

devotion he received during his illness from the medical and nursing staff of the Baltimore City Hospital, where he was serving his internship.

Besides his parents, Dr. Sommers is survived by a brother, Davidson, who is practicing law in New York, another brother, Frank M., a student at Harvard, and a sister, Elinor Julia, of Saint Paul.

Edwin Oscar Swanson

1891-1936

EDWIN O. Swanson was born in Brainerd, Minnesota, January 22, 1891. He spent his boyhood there, receiving his early education in the local high school.

He graduated from the Department of Medicine and Surgery in the University of Minnesota in 1916 and during the following year served his internship at the Ancker Hospital. He served as First Lieutenant in the United States Army Medical Corps during the World War, after which he engaged in practice in Saint Paul until the time of his death from pneumonia March 29, 1936.

Dr. Swanson enjoyed an extensive practice, and, as a tribute to him, it may be said that he won and enjoyed the respect and admiration of his friends and colleagues and of his patients, whose welfare was ever his first consideration.

As a man and citizen he was upright and honorable; as a colleague and friend he was loyal and sincere.

Dr. Swanson is survived by his widow, Mae E. Swanson; four brothers, Dr. John A. Swanson of Saint Paul; and Goethfried, William J. and Hilding Swanson, all of Brainerd; and two sisters, Mrs. Hannah A. Elfgren of St. Cloud and Mrs. Mabel E. Jackson of Minneapolis.

Neil M. Watson

1865-1936

DR. Neil M. Watson, Red Lake Falls, Minnesota, was born at Williamstown, Glengarry County, Ontario, August 20, 1865, the son of Reverend and Mrs. Peter Monroe Watson. His death occurred April 6, 1936, at his home.

Dr. Watson received his M.D. degree from McGill University in 1891 and began practice at Red Lake Falls in 1892. Taking an active interest in local affairs, he served as mayor of the town for several years and on the school board for twenty-nine years, having been president of the board for twenty-six years. He was also president of the Red Lake county fair for a number of years.

Ever since coming to this country Dr. Watson had been a staunch Republican and attended several state and national conventions. In 1928 he was a Ninth District delegate at Cleveland when Coolidge was nominated, and again a delegate in 1932.

In January, 1918, Dr. Watson was appointed member of the State Board of Health, on which he served until 1933. He was also a member of the Red Lake-Pennington-Marshall tuberculosis sanatorium board. He had been city and county physician for a number of years and served on the county health board. He

had also been local surgeon for the Northern Pacific railroad. For over twenty years he was vice president and director of the First State Bank of Red Lake Falls.

Dr. Watson was a member of the Crookston lodge of Elks, the Knights of Pythias and a life member of an Ontario Masonic lodge. He was a member of the Red River Valley Medical Society, Minnesota State and American Medical Association.

Dr. Watson never married. He is survived by a nephew, Dr. R. W. Watson, Highland Park, Michigan, and a cousin, Col. G. K. W. Watson, of Winnipeg.

The von Ruck Vaccine

The von Ruck Vaccine was first given publicity in 1912 by Dr. Karl von Ruck of Asheville, N. C., who was born in 1849 and was graduated in medicine in 1879. Dr. von Ruck died in 1922. In the period of 1912-1915, Dr. von Ruck received wide publicity for his alleged discovery of a "tuberculin," which, he asserted, would produce immunity from tuberculosis in both man and animals. Through political influence the United States Public Health Service was called on to investigate the von Ruck vaccine, and the newspapers published columns of laudatory matter on the subject. The sum and substance of the investigations made under government supervision were that immunity was not produced by the vaccine, but rather that the vaccine increased the susceptibility to tuberculosis. The newspapers gave practically no publicity to these unfavorable findings. Further political attempts were made to boost the vaccine, by printing at government expense as a Senate document, a mildly favorable article by two physicians. Time has obviously sustained the findings of the Public Health Service physicians, for, if the von Ruck vaccine possessed the virtues that were claimed for it, the scientific world would long since have adopted it. (J. A. M. A., December 7, 1935, p. 1935.)

Vitamin A and Urinary Lithiasis

Urinary calculi were known in remote antiquity and have been studied as to cause and treatment throughout many centuries. Most of the possible or likely etiologic factors have been given serious consideration and support by different investigators at various times. That some abnormality of diet, for example, excess of mineral elements, improper balance of its constituents, especially the inorganic elements, presence in it of some special stone-producing substance or other conditions affecting the diet might be the cause, has been considered for a long time. The idea, however, that a specific deficiency of the diet might be the cause is relatively recent and is the direct outcome of observations and experiments made on animals. In 1917, attention was drawn to the probability that a deficiency of a vitamin may be, at least indirectly, responsible for the formation of phosphatic urinary calculi in the rat. It was suggested that the calculi might be due, indirectly, to the effect of a deficiency of the fat-soluble group of vitamins. Although a number of investigations have been made in regard to the cause and treatment of urinary calculi, the Council on Pharmacy and Chemistry decided that the existing evidence does not warrant claims for the use of any of the vitamins, and particularly of vitamin A, in the prevention or treatment of urinary lithiasis and, further, that no such claims may appear in the advertising of accepted products. (J. A. M. A., December 14, 1935, p. 1983.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.
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Meeting the Area Men

Eight "area men," so-called, who represent the State Relief Administration throughout the state, met with officers, councilors and committeemen of the Minnesota State Medical Association in St. Paul recently.

The object was a better mutual understanding of practical problems involved in making arrangements for medical care of relief clients and the indigent generally.

Area men are in a position to influence county commissioners and welfare boards in their new organization for all phases of relief, including medical care.

The following remarks by Mr. L. P. Zimmerman, their chief and head of the State Relief Administration, are significant and encouraging.

Economy in the Long Run

They show, for one thing, that two years of experience with direct administration of medical relief have convinced fair-minded relief officials of the desirability of free choice of physician for the patient and of the preservation of the intimate relationship between patient and physician.

This same experience has convinced the state relief officials of the feasibility of medical care for the indigent on this basis and of its economy, in the long run, in the saving of both money and life.

Incidentally, Mr. Zimmerman's attitude as expressed here is in interesting contrast to the somewhat dubious and cautious state of mind of some of his predecessors in the early days of emergency relief in Minnesota.

"Thanks to the Depression"

Said Mr. Zimmerman:

"We have all had the satisfaction of seeing some good come out of this depression.

"For instance, we now know what it costs to provide medical care for the indigent. We know, also, what

percentage of a whole budget for relief should be set aside for medical care.

"These figures will soon be available from our headquarters in St. Paul. They are based upon SERA experience when there was federal money to draw upon and they are therefore inclined to be liberal.

For a Satisfactory Plan

"I believe that we can work out a satisfactory plan for every county in the state, now, on the basis of these figures.

"As you know, the county commissioners, not the Relief Office, are in charge now. But I believe we can show them on the basis of statistics that the bill will be greater in the end, not less, if medical care is not available at the time it is needed.

"That is an argument which I believe we can make the county commissioners see.

"They should be able to see, too, that the physician who knows the history of the patient and his family is much better able to care for the patient than a stranger.

"I believe, also, that county commissioners should see, as many of them do see, that it is not equitable for the medical profession to bear a larger share of the relief burden than other taxpayers.

Disease Prevention

"Our men could well talk disease prevention as they go about the state. Any publicity material you can give us to show the economics of treating disease early we shall be glad to distribute.

"We agree with you heartily in your dissatisfaction with the township plan of organization for handling relief.

"In fact, we are insisting now on a county organization in all the counties that are on the township plan for the purpose of handling relief emergencies.

"We are going to try to get legislation at the next session of the legislature to wipe out the township plan in Minnesota.

Unpaid SERA Bills

"One matter should be brought again to the attention of your members. Unpaid medical bills under SERA are not yet all in.

"If they are not in by June 1 the chances are that they will not be paid. Federal money that is now on deposit here for the purpose of winding up the affairs of the SERA will be withdrawn on that date,

and the Executive Council is quite likely to refuse to pay these old bills out of state and county funds."

Several "area men" spoke briefly to bear out what their chief said.

When "the Boss is Sold"

Mr. Andrew Taylor, assistant to Mr. Zimmerman:

"When the boss is sold, as Mr. Zimmerman is on your program for medical care, the underlings will follow. We will do our best to help you educate county commissioners."

Mr. A. V. Rohweder, chief advisor to the SERA Division of Safety and Compensation (Mr. Rohweder assisted in the fine organization of SERA Safety and Compensation work with its satisfactory provision for medical care for injured SERA workers' compensation, now terminated by WPA):

"I have always felt that the county physician plan for medical care of the indigent was not a good one. One man cannot possibly cover the work."

Half the Battle

"We have found in our work with employees of the United States Steel Corporation that the intimate personal relation between physician and patient aided by a complete case history is half the battle in the care of the sick."

Mr. Rohweder also asked that physicians be urged to send in outstanding bills for care of injured SERA workers. The SERA work program is now concluded and funds to pay outstanding bills under this program will not be available long.

SERA Reports

A résumé of SERA accomplishments and achievements published in the March *Memo* of the State Relief Administration included an interesting chapter on Health.

The figures herein contained are averages for the entire state. Figures for each county will soon be available, according to Mr. Zimmerman, for individual counties.

"One phase of the relief program," says the *Memo*, "has been the provision of medical, dental, and nursing care. Under the direction of nurses working from the state office and making visits in the field, there were 32 counties having nurses on their investigating staff. While these visitor-nurses carried active case loads, they also did extra work in the field of health."

"Although the figures on medical and other health care are not available for the calendar year, a survey made by the nurses on such care for the year from May 1, 1934, to May 1, 1935, reveals the follow-

President's Message

Encouraging

I want to ask you especially to read what Mr. L. P. Zimmerman, relief administrator for Minnesota, told a meeting of physicians and area relief men. It is printed on the opposite page.

Clearly medical men of Minnesota have the lines in their favor this time as they make the greatest effort in their history to solve the problem of medical care for the indigent.

With the sympathy and the intelligent understanding of these relief men and their chief, the education of county officials to a better appreciation of medical needs of their poor neighbors will be easier—provided always that the physicians themselves go about the business of negotiation with wisdom and understanding and fairness.

Difficult Job

Assuredly the county commissioners of Minnesota, with the entire responsibility for relief now returned to their shoulders, have a difficult job ahead of them.

They cannot pay out, in medical fees, money that is needed for food. Nor can they promise services that state appropriations and county tax funds will not cover.

The point for medical negotiators to remember and convey to these over-burdened officials is this: we are less interested in the fees to be collected, today, than we are in the establishment of a sound system which can be relied upon to provide proper care for the future.

Medical men in general will gladly adjust their own compensation for work done for the county poor to whatever sum can be set aside for that purpose, basing calculations upon the figures provided by Mr. Zimmerman.

Solemn Warning

And in this connection a solemn warning must, unfortunately, be issued to those physicians—and there are a few, even in Minnesota, even among our own members—who so far forget their responsibilities and obligations as to charge for unnecessary calls upon relief patients and otherwise pad their relief bills.

These men are injuring themselves and every one of their colleagues in Minnesota.

They are retarding a just settlement of the relief problem; they are holding up all medical men to obloquy and scorn; they are poisoning the minds of officials and laymen against a noble group of men, men whose first obligation is not to themselves or their bank accounts but to the men and women they are sworn to serve.

W. W. WILL, President,
Minnesota State Medical Association.

ing total figures which indicate to some extent the total scope of the work:

Home visits by doctors..45,084 (Maternity cases...4,275) (Prenatal cases...2,527)	Cost: Fees.....\$157,421 Mileage ...\$ 58,503
Office calls.....67,112	Cost .....\$105,926
Nursing care by Graduate nurses..... 354 Practical nurses.....1,312	Cost .....\$36,928

"A few other items of corrective work may be mentioned such as tonsillectomies and eye corrections. Such corrective work was given to 3,835 children and 3,521 adults at a total cost of \$86,185.

"Immunization was not attempted on any general scale by SERA since this was regarded as a local health responsibility, but in a few special cases immunization was done through the relief office.

"It is interesting to note that the clients receiving medical or dental care made their requests as follows:

"64 per cent were referred by the relief worker to the doctor.

"18 per cent were referred by the visitor to the doctor on the basis of findings brought to light on the home visit.

"18 per cent were referred by the doctor to the relief office for care.

"The counties spent approximately 4.5 per cent of their state and federal allocation for medical, dental, and other health care. The percentage varied from county to county according to particular needs. All but 19 counties spent less than 5 per cent of their state and federal money for medical care, while three counties having a particularly bad health situation went above 20 per cent of their total allocation.

"This medical, dental, and nursing program, although financed by state and federal funds largely, has permitted adequate health care to be given needy persons because of the excellent coöperation received by the relief office from practically every physician, dentist, and nurse taking part in the program. It is felt that the groundwork has been laid for a continuation under county auspices of a valuable service in the cause of better health and human happiness." (The italics are ours.)

Farmer Labor Platform

From the platform of the Farmer Labor party adopted at the convention at St. Paul March 28, 1936:

"We advocate the formation of consumers' coöperatives, credit unions, coöperative banking and service organizations, including coöperative enterprises for health, housing and rural electrification."

Several county organizations adopted more specific resolutions in favor of health insurance in advance of the state convention.

Many planks that appear in party platforms are quietly put up and taken down each year for many years before anyone makes a serious effort toward using them to erect anything permanent.

Such is likely to be the fate of this Farmer Labor gesture toward coöperative medicine.

It is a sign, however, and one which medical men should heed carefully. The trend is undoubtedly toward mass protection against all of the ills and hazards of life.

Sickness insurance will inevitably take its place with unemployment insurance and old age insurance as part of this protection unless medical organization shows a strength and resoluteness in opposition that will not be gainsaid.

The tide is carrying us towards medicine by bureaus and hirelings. Are American physicians content to drift with the tide?

Be Honest With Yourself

When you have finished your work today, sit down and study your methods. Go carefully over every step of each case, be honest with yourself and the patient, and then answer these questions:

1. Was I sincere in my examination? Did I give each case enough time and thought? Were the diagnoses and conclusions those of an honorable practitioner of the medical art?

2. Was I diplomatic in the handling of each case or was I argumentative and unreasonable? Did I use technical terms instead of less confusing English? Did I remember that to succeed one must be sensible with sensitive people? Did I remember, too, that the best policy is to be candid with each patient?

3. Was I tactful in advising the case, which had recently seen a competitor? Or was I inclined to be boastful and to make light of my associate's professional standing and work, thereby tending to break down the patient's confidence in all medical doctors?

4. Was I courteous in the face of disappointment or did I show my true feelings? Did I lose my temper or hold a friend by being polite?

The Medico-Legal Advisory Committee feels that a man cheats himself when he is unwilling to see his own weaknesses but profits most when he corrects those weaknesses. A singer corrects his faults by constant effort to improve his tone. A pole-vaulter improves by bettering his form. A salesman constantly studies his sales technic and approach and finds it is better to leave his customer with a smile than with a frown. Each medical man can be equally frank with himself and the best hope of improvement is a review of one's work at the close of the day.

It is certain that study and consequent correction of one's omissions means a collective less-

ening of the number of malpractice suits in Minnesota, as well as the payment of big *dividends of happiness* in work well done.

MEDICO-LEGAL ADVISORY COMMITTEE.

Physician's Riposte

Under the headline: "A Very Confining Regulation," the following note appeared in the April 15 *Memo* from the Social Service Division of State Relief Agency:

"County offices will recall that during the last five months of 1935 a change in the medical code prescribed that medical care must be given and the bill presented within five days after the date of authorization. Obviously this restriction was somewhat impractical in certain situations.

"There has just come to our attention a physician's riposte to the awkward rule. The letter of the physician was as follows:

"As per your orders Mrs. — was delivered within your five day period, in fact, on Sunday at 9 p. m.
 'Medicine, as you know, is not an exact science, principally because of the variable reactions of human beings. However, Orders is Orders. I wish, though, that next time, if there is any, you would please give me about nine months notice—I'm better on a longer stretch.

Best regards,

'P. S. There is no doubt about this being a relief case (relief for Mrs. — and myself).'"

Professional Jobless

A new study of the unemployed has just been made by the government.

Out of approximately six million relief cases studied, nearly one hundred thousand were found to be professional and technical workers.

"Believe it or not," says the *United States News*, commenting on the study, "the government found more than three thousand ministers and religious workers on its rolls. It discovered more than twenty thousand teachers and nearly one thousand lawyers along with over half a hundred physicians and surgeons."

A large group of the unemployed were found in the personal service and domestic fields. The number was set at six hundred thousand, about 10 per cent, which would be doubled if the American Federation of Labor's figures on unemployment are accepted and the total number of idle is above twelve millions.

Of the number covered in this census, twenty thousand were found to be hospital employees.

State Meeting

The 83rd annual sessions of the Council and the House of Delegates were about to convene as this issue went to press.

Many grave problems confront physicians these days. They must settle definitely upon

policies that may alter the whole course of medical practice in the United States.

Relief, the Social Security program, the proposed new welfare legislation all involve the medical profession as an integral part of their operating personnel.

A large part of this new social machinery will be directed by lay boards and administrators and medical men must constantly be on their guard lest medical care be hampered and misdirected through lay ignorance of medical problems. They must be on guard, also, lest these programs actually encroach upon and destroy the independent practice of medicine.

Medicine in America still believes that its future lies in the preservation of the individual initiative and responsibility of its practitioners.

Complete reports of the proceedings of these important Rochester sessions will be reviewed in these columns next month. Read them!

Brisk Sale

Two Minnesota State Medical Association publications continue to have a brisk sale.

The Handbook on the Debate question printed this year for the assistance of high school debaters has been noted widely in medical publications all over the country. The Diabetes booklet published under the auspices of the Committee on Diabetes in 1933 has already sold about 5,500 copies and orders are still coming in regularly.

Minnesota State Board of Medical Examiners

Albert Lea Woman Sentenced to One Year Term at Shakopee

State of Minnesota vs. Mrs. Frances Stauch.

On April 13, 1936, Mrs. Frances Stauch, forty-five years of age, of Albert Lea, Minnesota, entered a plea of guilty before the Honorable Kenneth G. Brill, Judge of the District Court of Ramsey County, Minnesota, to an information charging her with the crime of abortion. Judge Brill passed the case for sentence until April 21, 1936, to permit an investigation in reference to the past record of the defendant. On April 21, 1936, Judge Brill imposed a sentence of one year at hard labor at the Woman's Reformatory at Shakopee, Minn.

Mrs. Stauch, who has lived in Albert Lea for the past twenty-five years, came to Saint Paul on January 31, 1936, for the purpose of performing an abortion on a twenty-two year old Saint Paul girl, for which she was paid the sum of \$24.00 and a round trip bus ticket from Albert Lea to Saint Paul. Mrs. Stauch has no medical education except such as she acquired as a practical nurse on a few occasions in Albert Lea. She used a piece of elm bark which she had sharpened to a point and which resulted in a perforated bowel for the girl. The girl has been in a hospital from

February 9, 1936, to the present time. Mrs. Stauch stated to the Court that this was the only abortion she had ever performed on anyone except herself. The Court stated, however, that he was of the opinion that the defendant was an old offender and that the risking of the lives of girls at the hands of these quacks would have to stop; that she was being sentenced to Shakopee not only as a punishment to her, but as a warning to others.

Waseca Osteopath Pleads Guilty to Practicing Medicine Without a License

State of Minnesota vs. Wayne A. Hockett, D.O.

Wayne A. Hockett, twenty-five years of age, who holds a license to practice osteopathy in the State of Minnesota, entered a plea of guilty on April 20, 1936, at Owatonna, Minnesota, before the Honorable Fred W. Senn, Judge of the District Court, to an information charging him with practicing medicine without a license.

Hockett, who has practiced nearly two years at Waseca, Minnesota, was arrested on April 3, 1936, following an investigation conducted by the Minnesota State Board of Medical Examiners. This investigation disclosed that between March 2, 1936, and March 21, 1936, Hockett had written two prescriptions for medicine to be taken internally by one Max Schoenfeldt, who was suffering from cancer of the pancreas with metastasis of the liver. Hockett also gave Mr. Schoenfeldt two injections in the arm of a so-called cancer serum. For this, Hockett obtained the sum of \$150.00 cash in advance. A third injection was to be given (the agreed price being \$50.00 cash per injection), but, due to the severe illness of Mr. Schoenfeldt, was never administered. Mr. Schoenfeldt died on March 26, 1936. Following a complaint by a brother of Mrs. Schoenfeldt, Hockett returned \$100.00 of the fee. On the same day that Mr. Schoenfeldt died, Hockett went to his attorney and had a release prepared, which was signed by the widow, relieving Hockett of any liability for malpractice arising from the treatment and death of Mr. Schoenfeldt. The release specifically set forth that Mr. Schoenfeldt was treated for cancer by Hockett. The release also provided that the widow was to return to Hockett the balance of the capsules and pills then in the possession of the widow. When Hockett was interviewed by Mr. Brist, representing the Minnesota State Board of Medical Examiners, he stated that he did not know the name nor the ingredients of the serum that he had injected in the arm of Mr. Schoenfeldt.

Following the presentation of the facts, Judge Senn sentenced the defendant to pay a fine of \$250.00 or serve 120 days in the Waseca county jail. This sentence was suspended pending the good behavior of Hockett and on condition that he refrain from violating the Medical Practice Act in any manner in the future.

This is the first time in eight years that an osteopath has been arrested in Minnesota for practicing medicine without a license. In the past it has been the policy of the Medical Board either to take these cases up with the individual concerned or the Osteopathic Board. The Medical Board, however, feels that the osteopaths have had sufficient opportunity to acquaint themselves with the law which specifically forbids an osteopath to give or prescribe medicine for internal use. The Medical Board does not wish to institute a campaign against the osteopaths, but it shall insist that the osteopaths confine their practice to osteopathy and refrain from practicing medicine.

The Medical Board wishes to acknowledge the fine spirit of cooperation displayed in the case by Mr. John H. McLoone, County Attorney of Waseca County. The defendant was represented in the District Court by F. G. Sasse, attorney at Austin, Minnesota.

OF GENERAL INTEREST

Dr. Howard K. Gray of Rochester was recently elected president of the Rochester Community Chest.

* * *

Dr. William J. Eklund, Duluth, has filed as a candidate for state representative from the 57th district.

* * *

Dr. W. T. Greenfield has recently taken over the practice of the late Dr. V. P. Johnson at Delano, Minnesota.

* * *

Dr. W. F. C. Heise of Winona, who recently was injured in an automobile accident, is recovering nicely from his injuries.

* * *

Dr. John J. Ederer, who has been practicing at Cass Lake, is now associated in practice with Dr. W. G. Tanglin at Mahanomen.

* * *

Dr. and Mrs. Charles Stafford recently moved from Dent, Minnesota, to Hewitt, Minnesota, where Dr. Stafford has established a practice.

* * *

Dr. Edward Bratrud of Thief River Falls, Minnesota, recently returned from a six weeks' motor trip to Florida and through the southern states.

* * *

Dr. E. G. Olmanson, who has been practicing at Hanska, Minnesota, for the past two years, is now located in St. Peter, where he has established a practice.

* * *

Dr. J. F. Lynn, health officer of the city of Waseca for the past thirty-five years, retired from office last month. He will be succeeded in office by Dr. S. C. G. Oeljen.

* * *

Dr. J. S. Emond, a graduate of the University of Minnesota, College of Medicine, 1932, has moved to Farmington, Minnesota, where he will practice medicine and surgery.

* * *

Dr. O. F. Mellby, Thief River Falls, was elected president of the local Rotary Club at the annual meeting held in April. Dr. Mellby succeeds Dr. Edward Bratrud in this office.

* * *

Dr. William C. Carroll of Saint Paul has purchased a new home on the west shore of Lake Josephine, near Saint Paul. The residence is the former home of State Senator Joseph M. Hackney.

* * *

Dr. O. S. Wyatt of Minneapolis was elected president of Abbott Hospital staff at the annual meeting in April. Dr. K. A. Phelps was elected vice president, and Dr. A. E. Cardle, secretary.

Dr. Wade R. Humphrey of Stillwater has recovered sufficiently from his recent accident to attend to his office practice. Dr. Humphrey was recently elected president of the Stillwater Golf Club.

* * *

Dr. Hjalmer Mortensbak, a graduate of the University of Minnesota, College of Medicine, has completed his internship at the Minneapolis General Hospital and will locate at Hanska, Minnesota, this month.

* * *

Dr. C. N. Harris, health officer of Hibbing, headed a committee from the local Chamber of Commerce which collected the material to establish Hibbing's right as the healthiest city of 20,000 and under in the nation.

* * *

Dr. Myron O. Henry of Minneapolis was the guest speaker at the meeting of the Nebraska State Medical Society held at Lincoln, Nebraska, April 9. The subject of his talk was "Treatment of Fractures of the Spine."

* * *

Dr. Owen H. Wangenstein, head of the surgery department of the University of Minnesota, College of Medicine, was recently awarded the Samuel D. Gross prize in Surgery, for researches and discoveries relating to the treatment of intestinal obstruction.

* * *

Dr. Lee M. Eaton of Rochester, Minnesota, and Miss Mary Louise Long of Moline, Illinois, were united in marriage Thursday, April 2, 1936, in Moline. Dr. and Mrs. Eaton are now at home in Rochester, where Dr. Eaton is neurologist on The Mayo Clinic staff.

* * *

Dr. Thomas Lowry, son of Mrs. Horace Lowry of Minneapolis, and his fiancée, Dr. Elizabeth Chittenden, of New York and East River, Connecticut, have chosen July 3 as the date of their marriage, which will take place in East River, Connecticut. Both Dr. Lowry and Dr. Chittenden are serving internships at present.

* * *

The American Association for the Study and Control of Rheumatic Diseases is holding its fifth conference on rheumatic diseases at the Phillips Hotel, Kansas City, at nine o'clock Monday, May 11, 1936. The program will consist of an educational program on the differential diagnosis of diseases of the joints.

* * *

Dr. A. O. Swenson of Duluth was elected chief-of-staff at the annual meeting of the Miller Memorial Hospital, Duluth. Others elected to the staff are: Dr. Paul G. Boman, vice chief-of-staff; Dr. Ralph Eckman, secretary, and Dr. M. McC. Fischer and Dr. C. H. Schroeder, executive officers.

* * *

Dr. Baxter Smith, son of Dr. and Mrs. B. A. Smith of Crosby, Minnesota, has entered the General Hospital in Cincinnati, Ohio, to serve his internship, following his recent graduation from the University of Minne-

sota College of Medicine. He was one of the first nine to receive the A. O. A. honorary degree at the University this spring.

* * *

Dr. Kenneth F. Maxcy, professor of preventive medicine and bacteriology at the University of Virginia, has been appointed by the Board of Regents of the University of Minnesota as professor and head of the department of preventive medicine and public health. Dr. Maxcy takes the position formerly held by Dr. Harold S. Diehl, now dean of medical sciences. A graduate of George Washington University in 1911, Dr. Maxcy has been associated with the University of Virginia medical school since 1929.

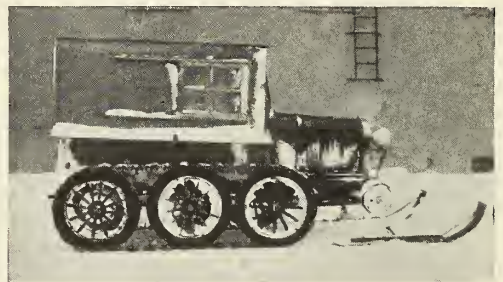
* * *

That Minnesota physicians are interested in local and county government is evidenced by recent elections, among which are the followig: Dr. B. C. Ford, Marshall—Mayor; Dr. H. A. Fasbender, Hastings—Mayor; Dr. E. G. Nethercott, Pine City—chairman of Pine County Republican Committee; Dr. R. C. Radabaugh, Hastings—chairman of Dakota County Republican Committee. Dr. M. M. Hursh of Grand Rapids has filed for re-election as county commissioner from the second district.

* * *

Dr. C. W. More of Eveleth has been appointed on the advisory committee of physicians to assist in formulating policies in solving problems of hospitals operated by the St. Louis County Poor Commission. Dr. B. S. Adams of Hibbing is chairman of the Commission. Other members of the advisory committee are: Dr. C. W. Parker, Ely, and Dr. C. W. Bray, Biwabik (for the Buhl hospital); Dr. J. R. Manley, Dr. E. W. Hatch and Dr. A. W. Coventry, Duluth (for the Hearing hospital). This is the first time in history, it is stated, that such a step has been taken by the Poor Commission.

* * *



The accompanying photograph is that of an assembled tractor made by Elihu Highland, a mail carrier of Briceyn, Minnesota, and commandeered on a certain occasion last winter by his fellow townsman, Dr. W. H. Sybilrud, to make a much needed professional call in subzero weather over drifted roads. The twenty-two mile round trip took some nine hours, and even this snowbird balked, the final mile having to be covered with a team and sled. City practitioners sometimes are forgetful of their blessings in the way of cleared streets and short distances.

TRANSACTIONS of the MINNEAPOLIS SURGICAL SOCIETY

Meeting of January 9, 1936

The President, DR. F. A. OLSON, in the Chair

THE regular monthly meeting of the Minneapolis Surgical Society was held in the lounge of the Hennepin County Medical Society rooms on January 9, 1936. The meeting was called to order by the President, Dr. F. A. Olson, at 8:00 p. m. There were forty members present.

The following scientific program was presented by members on the University staff:

REPORT ON BRAIN TUMOR OPERATIONS DONE AT THE UNIVERSITY HOSPITAL DURING THE YEAR 1935

WILLIAM T. PEYTON, M.D.

Abstract

A report was made on the cases of brain tumor examined at the University Hospital during the year 1935. There were fifty-four cases in which a diagnosis of brain tumor or probable brain tumor was made. In twenty-nine of these, the presence of a tumor was verified either by operation or biopsy. Twenty-four patients were operated upon for the purpose of removal of the tumor. Hospital and operative mortality was discussed and problems in diagnosis and treatment of certain types of tumor were illustrated by a discussion of individual cases in this series.

HIGH GASTRIC RESECTION IN CANCER OF THE STOMACH WITH RELATION OF PERSONAL EXPERIENCES

OWEN W. WANGENSTEEN, M.D.

Abstract

It is more than fifty years since Billroth did the first successful gastric resection for cancer of the stomach. In the intervening years, better diagnostic methods (the x-rays) and improved surgical technic, as Billroth foresaw, have improved the results of operation. Yet a spirit of extreme pessimism, in the main, dominates the picture of gastric cancer. To be sure, no one who has had a large experience in the treatment of cancer can escape the impression that, apart from cancers of the skin, the late results reckoned numerically, on the whole, are poor. Yet, palliation where cure can not be achieved is a well recognized principle of medical and surgical therapy. Any one who reads the surgical literature of cancer of the stomach of the last ten or fifteen years can not fail to see that the results of operative treatment of this disorder have definitely improved. This improvement has come about through earlier diagnosis and better operative technic.

In dyspepsias, a diagnosis must be *demand*ed rather

than symptomatic relief of distress by adjustments in the diet and the administration of alkaline powders. The manner in which cancer of the stomach is to be recognized earliest after the appearance of symptoms is through the employment of x-ray examination of the stomach in the hands of expert roentgenologists. The rate of growth of the malignancy influences the outlook just as much or more than does the earliest possible clinical recognition of the malignancy. There is assuredly, *acute and chronic cancer* as there is *acute and chronic infection*. Prolonged symptoms do not necessarily indicate that the lesion is an ulcer. The best results in the operative treatment of cancer of the stomach, on the whole, are attained in that group where the patient has had symptoms for a considerable length of time (one to two years or more) and at operation a resectable lesion is found. The patient with a tumor which has become as large as a baby's head in three months is not likely to have as good an outlook after resection as the patient whose tumor is small, though his story is longer.

Cases of gastric resection done for malignancy in the preceding thirty months were reported. These were thirteen in number. All but two were extensive operative removals in which it was necessary to do subtotal resections; one patient died—a mortality of 7.6 per cent. The repeated instillation of one-tenth normal hydrochloric acid into the stomach before operation through an inlying duodenal tube and the employment of suction after operation were stressed. Inhalation anesthesia (ethylene and ether) is employed regularly, a left rectus incision, and a posterior Polya type of anastomosis. In the operative procedure, because of the microbic character of the fasting stomach and upper reaches of the intestinal canal in the presence of gastric cancer, great care should be observed to avoid contamination. All mucous surfaces are gently swabbed with 1 per cent sodium ricinoleate (soap solution) to reduce the hazard of infection.

REPORT OF THE FOURTEENTH ANNUAL CONGRESS OF ANESTHETISTS

RALPH T. KNIGHT, M.D.

The Fourteenth Annual Congress of Anesthetists was held at Atlantic City, June 10-14, 1935, at the time of the joint meeting of the American and Canadian Medical Associations. Two half-day sessions were held jointly with sections of those associations, one a general session on anesthesia in the Section on Miscellaneous Topics, and the other a session on Obstetrical Anesthesia in the Section on Obstetrics, Gynecology, and Abdominal Surgery. In addition, the Anesthesia Congress held six half-day sessions of its own.

There were a number of foreign anesthetists who participated in the programs, among them Sir Francis Shipway, K.C.V.O., M.D., Anesthetist to the King, Guy's Hospital and Medical School, London; Noel A. Gillespie, D.M., B.Ch., M.A., Anesthetist to the London Hospital; and Gilbert R. Troup, M.B., B.S., M.R.C.P., Anesthetist to Perth Hospital, Perth, Western Australia.

Under *Anesthesia Teaching and Service* Dr. Thomas J. Collier of Atlanta, Georgia, President of the Associated Anesthetists of United States and Canada, called attention to the very small amount of instruction in anesthesia given in most Class A medical schools and even in most internships. Thus the great bulk of the graduates go out with no knowledge or skill in giving a safe or serviceable anesthesia. He called attention to the recent requirements of the American College of Surgeons and the American Medical Association regarding anesthesia supervision in accepted hospitals, and he pled for more effective teaching of anesthesia.

Dr. Henry S. Ruth of Philadelphia, Chief of Anesthesia at the Philadelphia General Hospital and President of the Eastern Society of Anesthetists, called attention to the fact that after the original advent of ether, chloroform, and nitrous oxide in the 1840's, anesthesia as a science and art remained practically static until the last few years, so that it became relegated to technicians as a routine procedure. Like obstetrics, which had remained so relegated for thousands of years and sprang into life and professional interest when newer knowledge arrived, so anesthesia is experiencing a renaissance and is offering surgery new and more comprehensive help, but special knowledge, experience, and skill is required, just as in other special fields. He urged that more physicians adequately prepare themselves for this service so that surgeons, finding the service available, will come to know its worth and embrace it as a further help in adding to their good results.

Dr. Arthur M. Wright, Professor of Surgery, New York University Medical College, spoke on "Teaching and Anesthesia Service from the Viewpoint of Surgery." He said, "Although anesthesia made the development of modern surgery possible, modern surgery has made the development of anesthesia a necessity. Anesthesia that offers only pain relief and muscle relaxation is not adequate today. The urgent demand is for an anesthesia which will at least not militate against the patient's convalescence and recovery. Unfortunately, no such security is generally offered. Much of the delay in post-operative recovery is post-anesthetic delay, and some post-operative mortality may be due to the anesthetic." He bemoaned the fact that now, nearly one hundred years after the discovery of ether anesthesia, the routine procedure in most hospitals in the United States is ether by the original method. He described the recent development of a professional anesthesia staff at Bellevue under Dr. E. A. Rovenstine, and contrasted the consultation value and the special knowledge and skill available with the situation under former conditions.

Experimental Investigation.—Dr. Ivan B. Taylor, in-

structor in anesthesia, University of Wisconsin, gave an interesting paper on leukocytosis following inhalation anesthesia.

Drs. Chester M. Kurtz, J. H. Bennett, and H. H. Shapiro, Division of Medicine, University of Wisconsin, presented "Studies on Electrocardiographic Changes under Surgical Anesthesia." They found that these changes occur in a great majority of cases with all anesthetics.

Dr. Frank Wang CoTui, Associate Professor of Experimental Surgery, New York University Medical College, showed by animal experiments the effects of posture, carbon dioxide, epinephrin, and ephedrin upon blood pressure and respiration under spinal anesthesia, justifying our clinical use of these agents.

Newer Anesthetics and Methods.—Sir Francis Shipway of London gave "Further Observations on Avertin Anesthesia." He advocated its more frequent use, especially for thyroid operations, and called attention to the fact that with skillful judgment of the patient's susceptibility or resistance to anesthesia the dose may be varied to give almost uniform results with all patients.

Dr. Paul M. Wood, Instructor in Anesthesia, Columbia, discussed the combined use and advantages of avertin and cyclopropane.

Dr. Harrold R. Griffith of Montreal presented further researches, experiences and results with cyclopropane anesthesia. He reported 1,108 administrations for all types of surgery, including 592 abdominal sections, 90 per cent of which were without the addition of any ether. Satisfactory relaxation was always procured. In 371 cases he preceded the cyclopropane with avertin. He states, "I believe the combination of avertin with cyclopropane forms the nearest approach we have yet made to the 'ideal anesthetic' . . . I feel that on the whole avertin is safer and more controllable than any of the barbiturates. Patients who have had avertin and cyclopropane for abdominal operations have had less postoperative discomfort than any previous series of patients in my experience. Certainly there has been less vomiting and less distention than in the patients to whom I formerly gave avertin, ethylene, and ether. . . . I do not give morphine when avertin is to be used." He gave cyclopropane 267 times through an endotracheal tube for head, neck, chest, and upper abdominal operations, especially in fat necked people. He found the tube a great help in obtaining quiet controllable breathing. He says the tube should not be used unless really needed for it tends to cause post-operative tickling and cough.

Dr. E. A. Rovenstine, Assistant Professor of Surgery in charge of anesthesia, New York University Medical School, and anesthetist in charge, Bellevue Hospital, spoke on "Cyclopropane Anesthesia in Thoracic Surgery," the advantages being lack of lung irritation, reduced respiratory minute volume, and adequate oxygenation, the only disadvantage being inflammability, which precludes the use of the endotherm knife, and the need for very accurate and understanding administration.

All who presented papers or entered discussion on cyclopropane were enthusiastic about it and had only

minor imperfections to mention, if any. All experience seems to be as favorable as our comparatively small experience with it here at Minnesota.

Dr. Pol N. Caryllos, Professor of Clinical Surgery, Cornell University Medical College, presented "Evipal Intravenous Anesthesia in Thoracic Surgery." He felt it exhibited certain advantages over inhalation anesthesia, especially in obtaining quiet breathing.

It might be interesting in this connection to relate a recent experience of ours. The patient, a robust man in his late thirties, had an acute and practically complete respiratory obstruction. The x-ray diagnosis was an intrathoracic tumor displacing the trachea far to the left and compressing it. The immediate acute symptoms came on during the taking of an esophagogram and the patient, very cyanotic, was rushed to the operating room. Evipal anesthesia was given and breathing at once became much less obstructed. A tracheotomy catheter was inserted past the obstruction and the patient returned to bed at ease and awake within a few minutes. An hour later it was decided that more comprehensive relief should be given without delay. Evipal intravenous anesthesia was again given and maintained for 50 minutes with fractional doses. The respiration then needed more positive control. Sterile draped respiratory tubes were hooked up to the tracheotomy tube and anesthesia was continued with cyclopropane and oxygen. The patient remained in excellent color and condition and was returned so to bed.

Dr. Frank W. Marvin, Assistant Professor of Anesthesia, Tufts College Medical School, and visiting anesthesiologist, Boston City Hospital, spoke on the clinical use of Vinethine (di-vinyl-oxide). It is nearly twice as potent as chloroform and four times as potent as ethyl ether but has a wide margin of safety. It is especially useful for short operations, even in the office, but he reported its generous use also for all types of surgery, with satisfaction. It is used on the open mask or added to the gases. He believes it has a great future.

Pre-anesthetic Medication.—Dr. Albert H. Miller, Providence, R. I., one of the deans in anesthesia, called attention again to the value of paraldehyde. Four to eight drachms given rectally in two ounces of mineral oil one hour before operation allays all apprehension and brings drowsiness or sleep from which the patient may be easily aroused to lapse again when quiet. The usual atropine is given but no morphine. It reduces clotting and bleeding time to about 90 seconds.

Katzman of Washington advocated its rectal administration with 1.5 c.c. of benzyl alcohol as a local rectal sedative, the whole washed in with saline instead of oil.

B. C. Leech, Director of Anesthesia, Regina General Hospital, reported pre-anesthetic medication in 500 children, and came to the conclusion that small doses of morphine and hyoscine are after all much safer and

more uniform than barbiturates. He gave a scale of dosage ranging from 1/40 to 1/600 gr. at age one to 1/12 and 1/300 gr. at age twelve. From six months to one year he gives only hyoscine gr. 1/900.

Hans Molitor, Rahway, N. J., reported researches on bulbocapnine.

Anesthesia for Obstetrics.—There was a symposium of six papers on obstetrical anesthesia, ranging through parasacral, pudendal, and local, spinal, barbiturates with rectal ether-oil, vinethene, cyclopropane, and a résumé of ether, chloroform, nitrous oxide and ethylene. The paper which probably attracted the most interest was the one by Dr. Gwathmey of New York and Dr. C. O. McCormick, Associate Professor of Obstetrics and Gynecology, University of Indiana Medical School. Their principle is to give 3 grains of pentobarbital sodium followed by 1½ grain doses as soon and as often as the patient wants it (not over 12 grains to be given) then 1/6 or 1/4 of morphine with about the second or third dose, but no morphine if delivery is expected within four hours. When the morphine begins to wear off, a mixture is injected into the rectum consisting of 20 grains quinine, 45 minims alcohol, 2 drachms paraldehyde, 2½ ounces ether, liquid petrolatum to make 4 ounces. The injection is repeated at the patient's desire at intervals of two and a half hours or longer. Nitrous oxide or ethylene or cyclopropane is given at the actual delivery. The effort is to cover the pain during the entire period of labor.

Therapeutic Nerve Block.—Interesting papers were given by Everett A. Tyler, Professor of Anesthesia, Hahnemann Medical School and Hospital, Philadelphia, and Elias L. Stern, Instructor in Anatomy, Columbia University School of Medicine, on the treatment of intractable pain, covering nerve blocking including the intraspinal injection of small quantities of alcohol.

Gas Therapy.—Disappointment was expressed by many in the long-time results in the prevention of postoperative pneumonia by hyperventilation with carbon dioxide and oxygen.

The simpler administration of oxygen by oro-pharyngeal insufflation was again presented by K. E. Lemmer, Ivan B. Taylor, and E. A. Rovenstine of the University of Wisconsin, as an aid to postoperative recovery, especially in pneumonia.

Dr. Alvan Barach, Associate in Medicine, Columbia University College of Physicians and Surgeons, presented the use of helium and oxygen as an aid in certain lung conditions, notably asthma, the principle being that helium, much lighter than nitrogen, is much more diffusible.

Following the scientific program a short executive meeting was held. The meeting was adjourned at 10:00 p. m.

E. A. REGNIER, M.D.
Secretary

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of March 11, 1936

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, March 11, 1936. The meeting was called to order by the President, Dr. Thomas S. Roberts, at 8 o'clock.

There were thirty-nine members and one guest present.

Minutes of the February meeting were read and approved.

Upon ballot, Dr. E. M. DeBerry was elected a candidate for University membership in the Academy.

The scientific program followed.

ANCIENT AND MODERN KNOWLEDGE CONCERNING ANAL FISTULA

LOUIS A. BUIE, M.D.

Rochester

Dr. Buie read his Inaugural Thesis on the above subject. Lantern slides were shown.

Abstract

Although discussions of anorectal disease appear in the earliest records of medical history, confusion still exists concerning the cause and management of anal fistula.

The position in which those who are unfortunate enough to have ischiorectal abscesses and anal fistulae find themselves today is not unlike that of those who were similarly afflicted centuries ago. Rarely are patients seen nowadays who have not been put through several "preliminary" operations before a cure is established, part of the confusion being attributable to a faulty conception of the origin and course of the disease and part to an improper terminology; the terms "rectal" and "anal" as applied to fistula being used interchangeably.

An anal fistula always originates as an infection in the anal crypts and extends outward, where it ultimately involves the ischiorectal space. Here, either rupture or surgical incision establishes the secondary opening on the surface of the body or within an adjacent viscus.

The crypts of Morgagni are of most concern in discussion of anal fistulae. These crypts and the adjacent papillae are susceptible to trauma during the daily bowel movement, and infecting organisms may be admitted. As a result of this invasion inflammatory changes involve the crypt and a focal point develops or a papilla may become enlarged with edema and seal itself over the crypt, thus forming a microscopic abscess. With the formation of these microscopic abscesses the first stage in the development of anal fistula has been passed. The second stage is the process of burrowing, and the infection may extend (a) subcutaneously and superficial to the anal muscles, (b)

through the muscular structures themselves, (c) between the internal and external sphincter muscles, or (d) upward beneath the mucosa of the rectum without first passing into the ischiorectal tissues. The third stage consists in the development of the ischiorectal abscess. With rupture or incision, the fourth stage is established and the anal fistula is complete; from this description it being apparent there can be no such thing as a blind internal or blind external anal fistula.

Treatment of this disease is surgical and embodies two chief factors: (1) conversion of all fistulous tunnels into open ditches with all margins dissected away in such a manner as to prevent accumulation of infectious intestinal discharges within the recesses of the wound; (2) avoiding the time-worn practice of packing wounds.

Discussion

DR. H. E. HULLSIEK (St. Paul): I should like to express my very keen appreciation of Dr. Buie's presentation and beautiful illustrations. It is always interesting for me to disagree with some of the things a speaker has said, but, in this case, Dr. Buie's views are so in accord with mine that I shall have to be content with a violent agreement with his principles. I especially like his attempt to clear up fallacies and misnomers in connection with terminology. I have always thought that these conditions should be called sinuses instead of fistulae. As I remember, a fistula is a channel uniting a hollow viscus with the external surface of the body or another viscus. Textbooks are still full of such terms as incomplete or blind fistula. The term fistula implies, as Dr. Buie says, a primary and secondary opening. I have also given up the use of methylene blue and Beck's paste as a means of determining the course of the tract. I do occasionally make use of probes, but the ones I use are of soft German silver wire and so flexible that one is unable to cause trauma or establish a false tract. I should like to ask Dr. Buie one question. Why must the tract be explored with the incision beginning at the primary opening? It has always been my practice to do it from the secondary or external opening, principally because the external opening is always obvious. It is certainly true that a fistulous tract is easy to follow without the use of dye or paste. The question of packing, I feel, is very important, and it is my practice to remove the packing at the end of forty-eight hours and not repack the wound at any subsequent time. If sufficient skin edge is removed so we have flat, saucer-shaped wounds, they cannot close over externally, but must heal from the bottom and do so without the thickened scar-tissue wall which results from continued packing.

DR. J. A. JOHNSON (Minneapolis): Dr. Buie has certainly given us a careful analysis of rectal fistulae.

I particularly appreciate his discussion of it from both the embryological and anatomical standpoint.

For many years I have found a prevalent notion among the profession that a large percentage of rectal fistulae are of tuberculous origin. No doubt the opinion has been handed down for a long time and probably arose from the fact that these sinuses remain open for many years until operated. Of course, if one is doing surgery in a tuberculosis sanatorium, he will no doubt find many resulting from this disease. It has, however, been my experience that very few of the "general run" of fistulae are tuberculous; and, when they are, one is quite certain to find tuberculosis in other parts of the body.

I would like to ask Dr. Buie what percentage of cases that he comes in contact with are tuberculous, and if it is not usual to find in these cases tuberculosis in other parts of the body?

DR. ARNOLD SCHWYZER (St. Paul): I join the other two gentlemen in thanking Dr. Buie for this splendid demonstration. I had always felt in my cases that Morgagni pockets were the origin of the fistula and I am glad to know that some one who sees a great many of these cases feels so too. Prof. Tavel, of Berne, published an article in one of the leading journals over there, in which he tried to give another origin for these fistulae. The glands in the lower rectum become larger and have a more acinous character. He showed that these glands become in places quite long and penetrate deeply even through the internal sphincter to form clusters on the outer side. Tavel thought an infection in these glands would lead to these fistulae, especially in the ischiorectal space. For that reason it was very valuable to me to hear some one of unusually large practical experience say that we don't need to hunt so far away for the origin, but to look closely at the Morgagni ridge. There was also something said about packing and, of course, much packing is wrong and an awful nuisance. I have hardly ever done more than put in a little strip. Recently I read in a Swiss medical journal an article by some one who showed that if you have a poorly granulating wound you get a wonderful effect by using cod liver oil locally. I could observe a surprisingly good effect after operation.

DR. O. H. WANGENSTEEN (Minneapolis): I hesitate very much to prolong this discussion. It is evident, however, that Dr. Buie's presentation struck a sympathetic note amongst the surgeons. As I listened, it sounded like a talk on the principles of wound surgery—a concept which is well worth keeping in mind in every type of surgery. John B. Murphy used to say that, if the external sphincter were divided in more than one place at a time, incontinence would follow. Dr. Buie, I believe, is authority for the statement that, if need be, the external sphincter may be simultaneously divided at more than one place with impunity. I should like to hear him discuss this point.

We see at the University occasionally very complicated cases of infection about the rectum. Some of these have had colostomies with complete deviation of the fecal stream and yet suppuration continues. Some of these I am inclined to believe are instances

of so-called lymphogranuloma inguinale. It is difficult to conceive of a case, which originated as a simple cryptitis or folliculitis, continue to suppurate after opening of the abscess and total diversion of the feces. In September, 1928, I saw with Dr. Michelson such a case. She also had a midline sternal ulcer. I gave her potassium iodide and the sternal ulcer healed and the rectal condition improved considerably. At the time I was inclined to believe that the rectal condition was a gumma (J.A.M.A., 1929, 93:1380-1382). Since becoming familiar with the picture of lymphogranuloma inguinale, I rather suspect that was the nature of the lesion present. Since then, I have seen additional cases. The Frei test in my own experience may be negative. Such cases are rarely identified and I have the impression that potassium iodide is as good a drug as any in their treatment. Early in their course a suppurative granulomatous condition is present; late, a stricture. Except for surgical relief directed at narrowing of the lumen, it would not appear that surgery is of any avail. Usually, however, when these cases come under observation extensive surgery has frequently already been done. I should like to ask Dr. Buie what his experience has been with cases of this sort.

DR. BUIE (in closing): Among ethical practitioners of medicine the operation of "splitting" the anal crypts is rarely used. In certain conditions, when the anus is badly infected or when there is inflammatory involvement or ulceration of the crypts, it is sometimes advisable to dissect away the tissues overlying the crypts in order to facilitate drainage of the infective intestinal excretions through the rectal outlet. When followed by proper local treatment this operation has value; however, the method has been used indiscriminately and should be condemned on that account.

I do not believe that the probe should be used in examining anal fistulae unless the utmost care is exercised. Whenever possible, the fistulous tract should be examined from the primary source toward the secondary opening, and on that account it is usually necessary for the tissue to be anesthetized. Only minor investigations should be carried out in the absence of anesthesia.

Tuberculosis is always an interesting topic when anal fistulae are discussed. Few patients who have anal fistulae are tuberculous, and, therefore, one need have little concern over the connection between tuberculous and fistulous processes. When tuberculosis is present, it should be dealt with independently of the fistula and the fistula should be eradicated unless the tuberculous process is so serious that operation cannot be performed.

On microscopic examination of the normal anal wall one finds glandular structures. These may be called "anal ducts" and they bear a certain relationship to anal crypts. In most instances they are indeterminate connections.

Vaseline gauze should be used in dressing anal rectal wounds and vaseline may also be incorporated in an iodoform gauze dressing. Ano-rectal wounds are painful at the epidermal margins and, when vaseline is incorporated in the dressing, it relieves the patient of a great deal of discomfort.

Fistulae cannot be cured unless those tissues which are external to the tract are cut, and if it happens that there is muscle between the fistulous tract and the exterior, the muscles must be included in the excision. Those fistulae which are associated with lymphogranuloma inguinale are usually most serious, and often in such cases it may not be possible to heal the fistulous tract. These, of course, are not anal fistulas in the strictest sense; they originate from the deformed and infected rectal wall and their course is irregular. Many times they may be rectovaginal, rectoperineal or rectovesical, and so forth. Usually an infected mass is present, consisting of scarred bowel and lymphoid tissue. The problem of treatment is the same as that which has to do with the cure of many of the more serious forms of benign rectal strictures, and often it cannot be solved with any degree of satisfaction. Colostomy with or without posterior resection often has to be considered.

MULTIPLE MYELOMA AND ITS DIFFERENTIAL DIAGNOSIS

C. B. WRIGHT, M.D.

Minneapolis

Dr. Wright gave a paper on the above subject and reported two cases. X-ray films were shown.

Our interest in multiple destructive bone lesions has been greatly increased recently by the brilliant results in the operative treatment of hyperparathyroidism. Not many clinicians have seen and recognized one of these cases, however, and most of us fear that we have probably overlooked the condition.

The following two case reports have interesting diagnostic features. Both had biopsies which were more confusing than diagnostic. In both, no Bence-Jones protein was found in the urine.

1. The first case was a man, aged fifty-one. There was no history of similar trouble in his family. There was a marked history of tuberculosis in both parents and two of his brothers had died from this disease. In his history the only thing of note was that as a child he had lumps on his head which later disappeared. He himself had no tuberculosis. He had been a well, vigorous man, and an athlete both in high school and college. His trouble began with pain in his left hip. He was examined first by a doctor about four months later. At that time his pain was very severe and apparently was aggravated by a cold and severe coughing. X-ray of the pelvis showed a large area of destruction in the wing of the left ileum which was approximately 9 cm. in diameter. This was the only definite lesion at that time. I saw him in March, 1930. At that time he had lumps in the ribs, and was having pains in his neck and right arm. He had a cyst in the lower jaw and on subsequent x-ray examinations up to January, 1931, he had developed lesions generally in both extremities, spine, ilium, ribs and skull. His pains seemed to be relieved very readily by x-ray. Sometimes lumps would appear and grow to the size of an egg in four to five days and dis-

appear in two or three days more, according to his own statement. On examination, these lumps were soft, easily compressible, and seemed to be surrounded by a margin of bone. The man also had an anemia which was not a true secondary anemia but suggested a primary anemia by a relatively high color index, presence of normoblasts, marked changes in the red cells with a comparatively low white count. There was no Bence-Jones protein found in the urine at any time. The diagnosis of multiple myeloma was made, clinically and by x-ray. A biopsy was made (apparently from the back, according to the patient's wife). On this biopsy the pathologist made the diagnosis of a round cell sarcoma because of the fact that the tumor tissue seemed to be in a gland and completely outside the bone. This diagnosis was made elsewhere and the slides were not available for study.

Reviewing the clinical history, x-rays and biopsy, the clinician in charge at the time of the patient's death felt that the condition was probably due to a multiple myeloma. Multiple myeloma may, of course, actually break through the periosteum and be found in the surrounding tissue and may also be found primarily in lymph glands or apparently in any of the hematopoietic tissues. Hyperparathyroidism was not thought of at that time and in the review of the case there is nothing to suggest this condition.

2. The second case, however, had quite a different picture. This patient was a man, fifty-five years old. His past history and his family history were entirely negative. The onset of his condition was in March, 1935, and began with pain in his left thoracic region, hips and back. It gradually progressed until he had pains in his knees, hips, thighs, and muscles. In July, 1935, he had his first x-rays, which showed, according to the report, marked decalcification of the bones of the pelvis and spine and narrowing of his vertebrae. He also showed an anemia which was not characteristically secondary in type. He showed no Bence-Jones protein in the urine. I saw him first in September, 1935. At that time he was chalky pale, having some gastrointestinal disturbances consisting of loss of appetite, constipation and gas; and he was having constant pain, especially over his left lower thoracic region. On feeling for his spleen a definite fracture at about the level of the ninth rib was diagnosed by the slipping of the anterior fragment under the finger. This produced very severe pain. He was also tender on pressure over the ribs, lower extremities, and back. He was again x-rayed and at this time he showed destructive lesions of his upper and lower extremities, left clavicle, ribs, pelvis, and also in his skull. He showed a very marked decalcification of the bony structures examined.

His blood count was hemoglobin 50 per cent, red cells 2,500,000, white cells 11,300. He showed marked changes in the size, shape, and staining of the red cells. The lymphocytes, small and large, were 50 per cent, polymorphonuclears 43 per cent, eosinophils 3 per cent, normoblasts 4, and 1 large monocyte.

The striking feature of the case was the very high blood calcium, which was 21.7 mgm. per 100 c.c. of blood, checked three times. There was no evidence of

glandular enlargement and no tumor palpable in the neck. Many of the bone lesions were fairly typical of those seen in hyperparathyroidism. Because of the rather low condition of the patient and the absence of a palpable tumor, deep x-ray therapy of the neck and ribs, where he was having his severest pain, was decided upon. This treatment relieved his pain completely and his general condition improved. His blood calcium subsequently seemed to show a continuous decrease. His anemia, however, did not improve but gradually grew a little worse. He was re-admitted for additional x-ray treatment about one month later because of increased pain in the pelvis and right side. The blood calcium had dropped to 16 mgm. He was given another course of deep x-ray over the neck, chest and pelvis. While in the hospital at this time a soft nodule was felt above his left eye about the size of a quarter. This nodule was easily compressible, and a margin of bone could be definitely felt around it. At this time it was decided to do a biopsy and the ninth rib on the left side was selected, where there seemed to be definite pathology by x-ray. A piece of the rib was scooped out with a curette and had apparently some soft tissue in it which disappeared on the way to the laboratory, because the report came back that there was no particular pathology in the specimen and that it was considered inadequate. X-ray showed no calcification in the kidneys.

He showed quite marked improvement as far as pain was concerned and was able to turn over in bed without assistance. He began eating well and sleeping well. In two months the blood calcium had dropped to 11.8 mgm. After several consultations, even in the

absence of a palpable tumor, exploration of his parathyroids was decided upon. The reasons for doing this were: First, the markedly high blood calcium which seemed to decrease steadily after his x-ray therapy, indicating that the parathyroids might be overactive; second, the appearance of some of the x-ray lesions; and third, the hopelessness on any other basis seemed to justify exploration.

Operation was performed under local and a careful search was made without finding evidence of parathyroid tissue. The patient stood the operation very well for the first two days. Following the operation the patient called my attention to the fact that the lump on his forehead had apparently disappeared. It was not visible, although a softened area could be felt. Unfortunately, he developed pneumonia and died on the 8th day after operation.

Dr. Norris performed the autopsy. The striking finding, grossly, was the complete softening of the bones of the spine, the bodies of the vertebrae being easily cut with a knife; and the multiple destructive areas in the skull. In places there was seemingly nothing but the periosteum over these lesions.

To sum up, two cases of multiple myeloma, the first clear-cut clinically, confused by wrong interpretation of a biopsy; no autopsy. The second, clinically resembling hyperparathyroidism, biopsy unsatisfactory, the lesions typical of multiple myeloma on autopsy.

The meeting adjourned.

R. T. LAVAKE, M.D.,
Secretary.

WOMEN'S AUXILIARY

of the MINNESOTA STATE MEDICAL ASSOCIATION

The various county auxiliaries will soon be concluding this year's activities, and plan to meet in Rochester on May 4, 5 and 6 to talk things over and elect new officers for 1936-37. Here's hoping we will see all of you there. A most interesting session has been planned by the Rochester auxiliary and there are to be many social events as well as business.

The Nominating Committee of the State Auxiliary was entertained at luncheon recently by Mrs. Martin Nordland, Chairman, of Minneapolis. The recommendations of the various county auxiliaries were considered and the results will be heard at the annual meeting in Rochester.

Mrs. F. J. Elias, State President, was the honored guest at a public relations tea given by the Ramsey County Medical Auxiliary on March 23, at the home of Mrs. Wm. H. Von der Weyer, Saint Paul. Mrs. John J. Ryan, president of the Ramsey County Medical Auxiliary, presided at a business meeting preceding the tea. The principal speaker was Dr. Wm. A. O'Brien,

University of Minnesota. There were representatives from approximately thirty-five women's organizations present. Arrangements for the tea were under the direction of Mrs. Asa Johnson.

From Hennepin County comes news that the Hennepin County Medical Society entertained the Auxiliary in honor of its 25th birthday. It was patterned after the Major Bowes Amateur Hour and was known as the "Chaste and Sunburn Hour." About 450 doctors and their wives attended this party. The evening was full of surprises and fun.

On April 13 the Hennepin County Auxiliary sponsored an Easter Card Party at the Walker Art Gallery. Mrs. R. G. Olson was general chairman of the arrangements. The party was very successful and the proceeds will be used for philanthropic work.

St. Louis County Auxiliary (Duluth) has reported on another highly successful bridge party. In spite of one of the spring snow storms which fell on the date, there were thirty-two tables filled for bridge.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for May

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 9:45 A. M. every Tuesday over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

May 5—Child Health.

May 12—Diabetes Mellitus.

May 19—Cosmetic Dermatitis.

May 26—Apical Dental Infection.

Minnesota Medical Alumni

There will be a Minnesota Medical Alumni dinner at the American Medical Association convention in Kansas City on Wednesday, May 13, 1936, at 6:30 p. m. at the Baltimore Hotel. Tickets may be secured at the Alumni Banquet desk. It is hoped that all Minnesota men attending the convention will plan to eat dinner together at this time.

Minnesota Hospital Association

The thirteenth annual convention of the Minnesota Hospital Association will be held Thursday and Friday, May 14 and 15, 1936, in Saint Paul at the Lowry Hotel.

Meetings will include addresses by prominent physicians and hospital officials as well as round table discussions on the various aspects of hospital administration, service and nursing education.

In conjunction with the meeting of the Minnesota Hospital Association, sectional meetings of the following organizations will be held on Thursday, May 14:

Minnesota Record Librarians Association

Minnesota State Dietetic Association

Minnesota Anesthetists Association

Superintendents of Hospital Training Schools

The meetings are open to all interested in hospital administration and a cordial invitation is extended to everyone so interested.

Minnesota Radiological Society

The Spring Meeting of the Minnesota Radiological Society was held at the St. Paul Athletic Club, St. Paul, Minn., Saturday, March 28, 1936. The following program was presented:

MAY, 1936

Demonstration of Device for Serial Examination of the Duodenal Bulb.

H. MILTON BERG, M.D., Bismarck, N. D.

Roentgen Findings in Monilia Infection of the Lungs.

KANO IKEDA, M.D., St. Paul

Radium Treatment of Postoperative Parotitis.

ROBERT FRICKE, M.D., Rochester

Roentgenologic Findings in Chronic Gastritis.

RUSSELL W. MORSE, M.D., Minneapolis

Roentgenologic Changes in Non-Tropical Sprue.

JOHN D. CAMP, M.D., Rochester.

Congenital Solitary Kidney with Traumatic Rupture Clinically Diagnosed

LESTER G. ERICKSEN, M.D., Dubuque, Iowa

Roentgen Treatment of Carcinoma of the Ovaries.

LEWIS JACOBS, M.D., Minneapolis

Roentgen Diagnostic Quiz.

Conducted by LEO G. RIGLER, M.D., Minneapolis

An informal dinner was held, following which there was an address by the guest of the Society, Dr. Ernst A. Pohle of Madison, Wis., on the "Radiological Treatment of Leukemia and Allied Disorders."

The next meeting of the Society will be held in connection with the meeting of the Minnesota State Medical Association in Rochester, Minn., May 4, 1936. Dr. Willis F. Manges of Philadelphia will be the guest speaker of the Society and will deliver the Carman Lecture to the members of the Minnesota State Medical Association on the subject, "Foreign Bodies."

LEO G. RIGLER, *Secretary*

Northern Minnesota Medical Association

The annual meeting of the Northern Minnesota Medical Association will be held this year in Fergus Falls, Monday and Tuesday, August 31 and September 1. Dr. F. J. Hirschboeck of Duluth is chairman of the Program Committee.

Washington County

The Washington County Medical Society had its regular monthly meeting on Tuesday, April 14, at the Stillwater club rooms. The fourth and last fracture lecture was given by Dr. Wallace Cole, of Saint Paul, who discussed injuries and fractures to the shoulder, spine, chest and pelvis. X-rays and graphic descriptions of treatments accompanied the lecture. Dr. Everett K. Geer, St. Paul, interpreted the x-rays of those Stillwater High School pupils whose Mantoux tests had been positive. Of 200 taking this test thirty-six had had positive Mantoux reactions.

E. SYDNEY BOLEYN, *Secretary*.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

HOW TO FEED CHILDREN IN NURSERY SCHOOLS. Mary E. Sweeny and Dorothy C. Buck, of the Merrill-Palmer School. 84 pages. Illus. (Free copies may be obtained from the Irradiated Evaporated Milk Institute, 203 N. Wabash Ave., Chicago.) Detroit: The Merrill-Palmer School, 1936.

BASAL METABOLISM IN HEALTH AND DISEASE. Eugene F. Dubois, M.D., Medical Director, Russell Sage Institute of Pathology; Professor of Medicine, Cornell University Medical College, etc. 494 pages. Illus. Price, cloth, \$5.00. Philadelphia: Lea & Febiger, 1936.

PHYSIOLOGY OF LOVE. Paolo Mantegazza. Translated from the Italian by Herbert Alexander. Edited with an introduction by Victor Robinson, M.D. 237 pages. Price, cloth, \$5.00. New York: Eugenics Publishing Co., 1936.

THE SINGLE, THE ENGAGED AND THE MARRIED. Maurice Chideckel, M.D. 268 pages. Price, cloth, \$2.50. New York: Eugenics Publishing Co., 1936.

BEWILDERED PATIENT. Marian Staats Newcomer, M.D. 323 pages. Illus. Price, cloth, \$1.75. Boston and New York: Hale, Cushman & Flint, 1936.

PEDIATRIC NURSING. John Zahorsky, A.B., M.D., F.A.C.P. Professor of Pediatrics, St. Louis University School of Medicine; Pediatrician-in-chief to the St. Mary's Group of Hospitals, etc. 568 pages. Illus. Price, cloth, \$3.00. St. Louis: C. V. Mosby Co., 1936.

THE BALANCED DIET. Logan Clendening, M.D., Professor of Clinical Medicine, University of Kansas, etc. 207 pages. Illus. Price, cloth, \$1.50. New York: D. Appleton-Century Co., 1936.

PARENTERAL THERAPY. Walton Forest Dutton, M.D., formerly Medical Director Polyclinic and Medico-Chirurgical Hospitals, Graduate School of Medicine, University of Pennsylvania, etc., and George Burt Lake, M.D., formerly Special Lecturer in Hygiene, Purdue University, etc. 376 pages. Illus. Price, cloth, \$7.50. Springfield, Ill.: Charles C. Thomas, 1936.

ALLERGY OF THE NOSE AND PARANASAL SINUSES. French K. Hansel, M.D., M.S., Assistant Professor of Clinical Otolaryngology, Washington University School of Medicine, etc. 820 pages. Illus. Price, cloth, \$10.00. St. Louis: C. V. Mosby Co., 1936.

CARDIOVASCULAR DISEASE. A new aspect of Cause and Treatment. J. H. Schrup, M.D., Dubuque, Iowa. (Reprint.) 20 pages. Price, paper cover, 12c.

THE TREATMENT OF DIABETES MELLITUS. Elliott P. Joslin, M.D., M.A., with the collaboration of Howard F. Root, M.D., Priscilla White, M.D., and Alexander Marble, M.D. 5th edition. 620 pages. Illus. Philadelphia: Lea and Febiger, 1935.

This book has been revised and rewritten; it follows the order of the fourth edition, but it covers the field

more comprehensively and effectively, and it is more concise. The author stresses the danger of disregarded obesity, needless deaths resulting from tuberculosis (both in infants and adults), from arteriosclerosis, gangrene, and coma, infection, and all other complications of diabetes.

Dr. Joslin's associates contribute certain chapters giving their highly specialized knowledge of surgery, their handling of children and pregnancies complicated by diabetes. He suggests that we must resort to cesarean section more frequently than has been done to date to avoid loss of the infant and to prevent injury to and exhaustion of the mother.

This book should be read by every practitioner of medicine in order that he may realize the changes that have taken place in the treatment of diabetes, particularly as to low caloric, higher carbohydrate diets and the experimental and clinical reasons therefor.

M. M. SARNECKI, M.D.

INFANT NUTRITION. Williams McKim Marriott, B.S., M.D., Professor of Pediatrics, Washington University School of Medicine; Physician in Chief, St. Louis Children's Hospital, St. Louis, Mo. Second Edition. 431 pages. Illus. Price, \$4.50. St. Louis: C. V. Mosby Company, 1935.

In this, the second edition, Dr. Marriott has fully revised and brought down to date the subject of infant nutrition. The first chapter, dealing with growth and nutrition, stresses the need for adequate physical growth in order that mental development may not be retarded.

Metabolism deals with the food values of the various substances ingested, and the necessity for a varied diet. He also discusses at length the nutritional elements and their place in infant feeding. The statement that "The giving of food of too low a caloric value to meet the infant's needs is by all odds the chief cause of failure in infant feeding," cannot be too strongly emphasized.

The chapter on vitamins adequately portrays the present status of these necessary elements in the diet.

The chapters on digestion and stools are worthy of careful perusal, while that on breast feeding is clear, concise and practical. The chapter on artificial feeding contains much information and covers the question of variety.

In the discussion of malnutrition, diarrhea, vomiting, etc., the author shows evidence of a thorough knowledge of the problems involved.

The subject of prematurity is adequately dealt with and a newly added subject, allergy, is given full consideration.

A discussion of common affections covers a fairly large range of subjects, all of which are timely and informative.

The book as a whole will be found a reliable guide to any one interested in the many problems of infant nutrition.

J. T. CHRISTISON, M.D.

MINNESOTA MEDICINE

MINNESOTA STATE MEDICAL ASSOCIATION

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A. J. LEWIS, M.D.	Henning
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*Terms expire December 31, of year indicated.

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 Yellow Medicine

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 Nicollet, Renville, Scott, Sibley, Waseca

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 Counties—Anoka, Chisago, Dakota, Isanti, Kanabec,
 Mille Lacs, Pine, Ramsey, Sherburne, Washington

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 water, Crow Wing, Hubbard, Morrison, Koo-
 chiching, Stearns, Todd, Wadena

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 Counties—Becker, Clay, Douglas, Grant, Kittson,
 Lake of the Woods, Mahnomen, Marshall,
 Norman, Otter Tail, Pennington, Polk,
 Red Lake, Roseau, Wilkin

DISTRICT NO. 9

B. S. ADAMS, M.D.....Hibbing
 Counties—Carlton, Cook, Itasca, Lake, St. Louis

MINNESOTA STATE MEDICAL ASSOCIATION

COUNTY SOCIETY ROSTER

BLUE EARTH COUNTY MEDICAL SOCIETY

Regular meetings, last Monday of each month
Annual meeting, December
Number of Members: 29

President
Sommer, A. E. Mankato

Secretary
Koenigsberger, Charles Mankato

Andrews, R. N. Mankato
Benham, E. W. Mankato
Black, William. Mankato
Butzer, J. A. Mankato
Dahl, G. A. Mankato
Denman, A. V. Mankato

Edwards, R. T. Elysian
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Fugina, G. R. Mankato
Hassett, R. G. Mankato
Holbrook, J. S. Mankato
Howard, M. I. Mankato
Juliar, R. O. St. Clair
Kemp, A. F. Mankato
Liedloff, A. G. Mankato
Lloyd, H. J. Mankato
Macbeth, J. L. St. Clair
Miller, V. L. Mankato

Osborn, Lida. Mankato
Penn, G. E. Mankato
Samuelson, L. G. Mankato
Schlesselman, J. T. Mankato
Schmidt, P. A. Good Thunder
Sommer, A. E. Mankato
Stillwell, W. C. Mankato
Troost, H. B. Mankato
Vezina, J. C. Mapleton
Wentworth, A. J. Mankato
Williams, H. O. Lake Crystal

BLUE EARTH VALLEY MEDICAL SOCIETY

Faribault and Martin Counties
Regular meetings, first Thursday of February, May, August and November
Annual meeting, first Thursday in November
Number of Members: 35

President
Sommer, A. W. Elmore

Secretary
Chambers, W. C. Blue Earth

Bailey, H. B. Fairmont
Barr, W. H. Wells
Blanchard, H. G. Fairmont
Boysen, Herbert. Welcome
Chambers, W. C. Blue Earth
Cooper, M. D. Winnebago
Demo, P. W. Wells
Farrish, R. C. Sherburn

Folta, John. Ceylon
Gardner, V. H. Fairmont
Hankerson, R. G. Minnesota Lake
Heimark, J. J. Fairmont
Henderson, A. J. Kiester
Holm, P. F. Wells
Hunt, R. C. Fairmont
Hunte, A. F. Bylas, Arizona
Jacobs, A. C. Elmore
Johnson, D. W. Fairmont
Johnson, H. P. Fairmont
Logan, F. W. Blue Earth
Luedtke, G. H. Fairmont
McGroarity, J. J. Easton

Miller, H. A. Fairmont
Mills, J. L. Winnebago
Rowe, W. H. Fairmont
Raymond, J. H. Triumph
Russ, H. H. Blue Earth
Sommer, A. W. Elmore
Sybilrud, H. W. Bricelyn
Thayer, E. A. Truman
Vaughan, V. M. Truman
Virmig, M. P. Wells
Wells, W. B. Sherburn
Wilson, C. E. Blue Earth
Zemke, E. E. Fairmont

CAMP RELEASE DISTRICT MEDICAL SOCIETY

Chippewa, Lac Qui Parle, and Yellow Medicine Counties
Regular meetings, every two weeks in Fall and Spring
Annual meeting, November
Number of Members: 22

President
Nelson, M. S. Granite Falls

Secretary
Westby, Nels. Madison

Bacon, R. S. Montevideo
Bergh, L. N. Montevideo
Burns, M. A. Milan
Cress, E. E. Boyd

Foshager, H. T. Clara City
Haug, M. I. Clarkfield
Hauge, M. M. Clarkfield
Herbert, W. L. Maynard
Holmberg, L. J. Canby
Johnson, C. M. Dawson
Jordan, L. S. Granite Falls
Kath, R. H. Wood Lake
Kilbride, J. S. Canby

Lee, W. N. Madison
Lima, Ludvig. Montevideo
Nelson, M. S. Granite Falls
Olson, W. P. Gaylord
Roust, H. A. Montevideo
Smith, L. G. Montevideo
Tangen, G. M. Canby
Westby, Magnus. Madison
Westby, Nels. Madison

CLAY-BECKER COUNTY MEDICAL SOCIETY

Regular meetings, none
Annual meeting, December
Number of Members: 23

President
Duncan, J. W. Moorhead

Secretary
Flancher, L. H. Lake Park

Aborn, W. H. Hawley
*Archibald, F. M. Mahnomen
Berghheim, M. C. Hawley

Carman, J. E. Detroit Lakes
Duncan, J. W. Moorhead
Ellingson, A. R. Detroit Lakes
Flancher, L. H. Lake Park
Gosslee, G. L. Moorhead
Hagen, O. J. Moorhead
Haight, G. G. Audubon
Humphrey, E. W. Moorhead
Ingebritson, E. K. Moorhead

Larsen, O. O. Detroit Lakes
Larson, Arnold. Detroit Lakes
Moberg, C. W. Lake Park
Rutledge, L. H. Detroit Lakes
Simson, C. W. Hawley
Staflne, W. A. Moorhead
Soine, T. S. Barnesville
Thysell, F. A. Moorhead
Thysell, V. D. Hawley

DAKOTA COUNTY MEDICAL SOCIETY

President
Peck, L. D. Hastings

Secretary
Burns, L. S. South Saint Paul

Burns, L. S. South Saint Paul
Peck, L. D. Hastings
Peck, L. R. Hastings

ROSTER MINNESOTA STATE MEDICAL ASSOCIATION

EAST CENTRAL MINNESOTA MEDICAL SOCIETY Anoka, Chisago, Isanti, Kanabec, Mille Lacs, Pine and Sherburne Counties Annual meeting, November Number of Members: 34

President
Norrsgard, H. T. Milaca
Secretary
Hansen, E. H. Princeton
Arends, A. L. Askov
Blomberg, W. R. Princeton
Blumenthal, J. S. Columbia Heights
Bossert, C. S. Mora
Brown, R. W. Cambridge
Brownstone, Manuel. Sandstone
Callahan, F. F. Pokegama
Cooney, H. C. Princeton

Dredge, H. P. Sandstone
Halpin, J. E. Rush City
Hansen, E. H. Princeton
Heseltine, V. G. Taylors Falls
Holmes, A. E. Rush City
Johnson, D. L. Cambridge
Kelsey, C. G. Hinckley
Kooker, H. J. Milaca
McBroom, D. E. Cambridge
Ness, C. M. Cambridge
Nethercott, E. G. Pine City
Nordman, W. F. Mora
Norrsgard, H. T. Milaca

Nygren, W. T. Braham
Petersen, P. C. Ogilvie
Peterson, A. A. Mora
Roehlke, A. B. Elk River
Schlesselman, George. Anoka
Spurzem, R. J. Anoka
Stephan, E. L. Hinckley
Stratte, A. K. Pine City
Swensen, R. G. Harris
Tuog, C. P. Lindstrom
Vik, Melvin Onamia
Wahlberg, E. W. Isle
Zeien, Thomas. North Branch

FREEBORN COUNTY MEDICAL SOCIETY Regular meetings, Quarterly Annual meeting, December Number of Members: 23

President
Kaasa, L. J. Albert Lea
Secretary
Gamble, P. M. Albert Lea
Barr, L. C. Albert Lea
Branham, D. S. Albert Lea
Burns, H. D. Albert Lea

Butturff, C. R. Freeborn
Calhoun, F. W. Albert Lea
Donovan, D. L. Albert Lea
Folken, F. G. Albert Lea
Freeman, J. P. Albert Lea
Freligh, W. P. Albert Lea
Gamble, J. W. Albert Lea
Gamble, P. M. Albert Lea
Gullixson, A. Albert Lea
Jerome, Bourne Emmons

Kaasa, L. J. Albert Lea
Kamp, B. A. Albert Lea
Leopard, B. A. Albert Lea
Manley, L. V. Albert Lea
Merrit, W. A. Albert Lea
Palmer, C. E. Albert Lea
Palmer, W. L. Albert Lea
Schultz, J. A. Albert Lea
Trytzen, E. G. Albert Lea
Whitson, S. A. Alden

GOODHUE COUNTY MEDICAL SOCIETY Regular meetings, none Annual meeting, December Number of Members: 20

President
Claydon, H. F. Zumbrota
Secretary
Steffens, L. A. Red Wing
Aanes, A. M. Red Wing
Anderson, S. H. Red Wing

Brusegard, J. F. Red Wing
Claydon, D. R. Red Wing
Claydon, H. F. Zumbrota
Claydon, L. E. Red Wing
Cremer, P. H. Hastings
Flom, M. G. Zumbrota
Hedin, R. F. Red Wing
Johnson, A. E. Red Wing
Jones, A. W. Red Wing

Juers, E. H. Red Wing
Levi, Sam. Red Wing
Liffrig, W. W. Goodhue
Mack, J. J. Magnolia, Arkansas
McGuigan, H. T. Red Wing
Smith, M. W. Red Wing
Steffens, L. A. Red Wing
Vaaler, T. Cannon Falls
Williams, M. R. Cannon Falls

HENNEPIN COUNTY MEDICAL SOCIETY Regular meetings, first Monday each month Annual meeting, October Number of Members: 570

President
Cranmer, R. R. Minneapolis
Secretary
Campbell, O. J. Minneapolis
Ahrens, R. S. Minneapolis
Alexander, H. A. Minneapolis
Aling, C. A. Minneapolis
Allen, H. W. Minneapolis
Allison, R. G. Minneapolis
Altnow, H. O. Minneapolis
Andersen, A. G. Minneapolis
Andersen, S. C. Minneapolis
Anderson, D. D. Minneapolis
Anderson, E. D. Minneapolis
Anderson, E. R. Minneapolis
Anderson, F. J. Minneapolis
Anderson, J. K. Minneapolis
Anderson, K. W. Minneapolis
Anderson, P. A. Minneapolis
Andreassen, E. C. Minneapolis
Andrews, R. S. Minneapolis
Annis, H. B. Minneapolis
Arey, S. L. Excelsior
Arlander, C. E. Minneapolis
Arnold, D. C. Minneapolis
Arvidson, C. G. Minneapolis
Aune, Martin. Minneapolis
Aurand, W. H. Minneapolis
Avery, J. F. Minneapolis
Baken, M. P. Minneapolis
Baker, A. T. Minneapolis
Baker, E. L. Minneapolis
Baker, Looe Minneapolis
Barber, J. P. Minneapolis
Barron, Moses Minneapolis
Bass, G. W. Minneapolis
Baxter, S. H. Minneapolis
Bayard, H. F. Minneapolis
Beard, A. H. Minneapolis
Beard, R. O. Minneapolis
Beckman, W. G. Minneapolis
Bedford, E. W. Minneapolis
Bell, E. T. Minneapolis

Benjamin, A. E. Minneapolis
Benjamin, E. G. Minneapolis
Benn, F. G. Minneapolis
Berger, A. G. Minneapolis
Berkwitz, N. J. Minneapolis
Bessesen, A. N., Jr. Minneapolis
Bessesen, D. H. Minneapolis
Bessesen, W. A. Minneapolis
Blake, James. Hopkins
Blaustone, H. H. Minneapolis
Bockman, M. W. H. Minneapolis
Boies, L. R. Minneapolis
Booth, A. E. Minneapolis
Borgeson, E. J. Minneapolis
Bouman, H. A. H. Minneapolis
Boynton, Ruth. Minneapolis
Bracken, H. M. Minneapolis
Bratrud, A. F. Minneapolis
Brooks, C. N. Minneapolis
Brown, E. D. Minneapolis
Brown, E. J. Minneapolis
Bryant, O. R. Minneapolis
Bulkley, Kenneth Minneapolis
Bullard, Mattie J. Minneapolis
Butler, John Minneapolis
Buzzle, L. K. Minneapolis
Cable, M. L. Minneapolis
Cabot, V. S. Minneapolis
Cady, L. H. Minneapolis
Callerstom, G. W. Minneapolis
Cameron, Isabell Minneapolis
Camp, W. E. Minneapolis
Campbell, L. M. Minneapolis
Campbell, O. J. Minneapolis
Cardle, A. E. Minneapolis
Carey, J. B. Minneapolis
Carlaw, C. M. Minneapolis
Carlson, H. A. Minneapolis
Carlson, Lawrence. Minneapolis
Caron, R. P. Minneapolis
Cavanor, F. T. Minneapolis
Cherry, C. H. Minneapolis
Chesley, A. J. Minneapolis
Christenson, C. R. Minneapolis

Christianson, H. W. Minneapolis
Clark, H. S. Minneapolis
Cohen, S. S. Oak Terrace
Condit, W. H. Minneapolis
Cook, H. W. Minneapolis
Cooperman, H. O. Minneapolis
Corbett, J. F. Minneapolis
Corniea, A. D. Minneapolis
Cosman, E. O. Minneapolis
Cottam, G. G. Minneapolis
Crafts, L. M. Minneapolis
Cranmer, R. R. Minneapolis
Cranston, R. W. St. Louis Park
Creedy, C. D. Minneapolis
Creighton, R. H. Minneapolis
Curtin, J. F. Minneapolis
Cutts, George. Minneapolis
Cutts, R. E. Minneapolis
Dady, E. E. Minneapolis
Dahl, E. O. Minneapolis
Dahl, J. A. Minneapolis
Daniel, D. H. Minneapolis
Daniel, L. M. Minneapolis
Dart, L. O. Minneapolis
Davis, J. C. Minneapolis
del Plaine, C. W. Minneapolis
Devereaux, T. J. Wayzata
Diehl, H. S. Minneapolis
Diessner, H. D. Minneapolis
Donaldson, C. A. Minneapolis
Dorge, R. I. Minneapolis
Dornblaser, H. B. Minneapolis
Dorsey, G. C. Minneapolis
Doxey, G. L. Minneapolis
Doyle, L. O. Minneapolis
Drake, C. R. Minneapolis
Drill, H. E. Hopkins
Duff, E. R. Minneapolis
Dukelow, D. A. Minneapolis
Dumas, A. G. Minneapolis
Dunlap, E. H. Minneapolis
Dunn, G. R. Minneapolis
Duryea, W. M. Minneapolis
Dutton, C. E. Minneapolis

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Dworsky, S. D.	Minneapolis	Hughes, L. D.	Minneapolis	McCartney, J. S.	Minneapolis
Ehrenberg, C. J.	Minneapolis	Hultkrans, R. E.	Minneapolis	McDaniel, Orianna	Minneapolis
Ehrlich, S. P.	Minneapolis	Hurd, Annah	Minneapolis	McFarland, A. H.	Minneapolis
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Eitel, G. D.	Minneapolis	Hynes, J. E.	Minneapolis	McGregor, Catherine	Minneapolis
Ellison, D. E.	Minneapolis	Irvine, H. G.	Minneapolis	McInerny, Maurice	Minneapolis
Engstrand, O. J.	Minneapolis	Jackson, C. M.	Minneapolis	McIntyre, George	Minneapolis
Erb, F. A.	Minneapolis	Jennings, F. L.	Oak Terrace	McKinlay, C. A.	Minneapolis
Erdmann, C. A.	Minneapolis	Jennings, Mary H.	Minneapolis	McKinley, J. C.	Minneapolis
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Ericsson, R. M.	Minneapolis	Jensen, M. J.	Minneapolis	McPheeters, H. O.	Minneapolis
Evans, E. T.	Minneapolis	Johnson, A. B.	Minneapolis	McQuarrie, Irvine	Minneapolis
Evans, R. D.	Minneapolis	Johnson, A. E.	Minneapolis	Mee, P. H.	Osseo
Exley, E. W. F.	Minneapolis	Johnson, H. A.	Minneapolis	Meland, E. L.	Minneapolis
Fahr, G. E.	Minneapolis	Johnson, J. A.	Minneapolis	Merkert, C. E.	Minneapolis
Fansler, W. A.	Minneapolis	Johnson, Julius	Minneapolis	Merkert, G. L.	Minneapolis
Feeney, J. M.	Minneapolis	Johnson, N. A.	Minneapolis	Merrill, Elizabeth	Minneapolis
Fenger, E. P. K.	Oak Terrace	Johnson, Norman	Minneapolis	Meyer, E. L.	Minneapolis
Fink, L. W.	Minneapolis	Johnson, R. A.	Minneapolis	Michael, J. C.	Minneapolis
Fink, W. H.	Minneapolis	Johnson, S. M.	Minneapolis	Michelson, H. E.	Minneapolis
Fitzgerald, D. F.	Minneapolis	Johnson, Y. T.	Minneapolis	Miller, H. E.	Minneapolis
Fjeldstad, C. A.	Minneapolis	Johnston, L. F.	Minneapolis	Miller, J. C.	Minneapolis
Ford, W. H.	Minneapolis	Jones, G. M.	Minneapolis	Milton, J. C.	Minneapolis
Foster, W. K.	Minneapolis	Jones, H. W.	Minneapolis	Moe, J. H.	Minneapolis
Fowler, L. H.	Minneapolis	Jones, W. R.	Minneapolis	Moir, W. W.	Minneapolis
Frary, Louise G.	Minneapolis	Joseph, Alexander	Minneapolis	Moorhead, Martha B.	Minneapolis
Fredericks, G. M.	Minneapolis	Kalin, O. T.	Minneapolis	Moren, Edward	Minneapolis
Freidman, L. L.	Minneapolis	Kelby, G. M.	Minneapolis	Moriarty, Cecile R.	Minneapolis
Friedell, Aaron	Minneapolis	Kennedy, C. C.	Minneapolis	Morrison, A. W.	Minneapolis
Fritzell, K. E.	Minneapolis	Kennedy, Jane F.	Minneapolis	Morse, R. W.	Minneapolis
Frœhlich, H. W.	Minneapolis	Kennedy, R. R.	Minneapolis	Morton, H. McI.	Vincetown, N. J.
Funk, V. K.	Oak Terrace	Kertesz, G.	Minneapolis	Murphy, I. J.	Minneapolis
Gammell, J. H.	Minneapolis	Kibbe, O. A.	Minneapolis	Myers, J. A.	Minneapolis
Gardner, E. L.	Minneapolis	King, E. A.	Minneapolis	Nathanson, M. H.	Minneapolis
Giere, E. O.	Minneapolis	King, H. T.	Minneapolis	Neal, J. M.	Minneapolis
Giere, J. C.	Minneapolis	Kinsella, T. J.	Minneapolis	Neary, R. P.	Minneapolis
Giere, R. W.	Minneapolis	Kistler, A. J.	Minneapolis	Neilson, H. F.	Minneapolis
Giessler, P. W.	Minneapolis	Kistler, C. M.	Minneapolis	Nelson, H. S.	Minneapolis
Gilles, F. L.	Minneapolis	Knapp, M. E.	Minneapolis	Nelson, Harvey	Minneapolis
Gingold, B. A.	Minneapolis	Knight, R. R.	Minneapolis	Nelson, O. E.	Minneapolis
Golberg, M. L.	Minneapolis	Knight, R. T.	Minneapolis	Newhart, Horace	Minneapolis
Goldman, T. I.	Minneapolis	Koeckpe, G. M.	Minneapolis	Nordin, G. T.	Minneapolis
Gratzek, F. R.	Minneapolis	Koller, H. M.	Minneapolis	Nordland, Martin	Minneapolis
Grave, Floyd	Minneapolis	Koller, L. R.	Minneapolis	Noth, H. W.	Minneapolis
Gray, R. C.	Minneapolis	Kucera, F. J.	Hopkins	Nystrom, Ruth	Minneapolis
Green, E. K.	Minneapolis	Kucera, W. J.	Minneapolis	Oberg, C. M.	Minneapolis
Greene, W. P.	Minneapolis	Lajoie, J. M.	Minneapolis	O'Brien, W. A.	Minneapolis
Greisheimer, Esther M.	Minneapolis	Lapierre, A. P.	Minneapolis	O'Donnell, J. E.	Minneapolis
Grines, Marian	Minneapolis	Lapierre, C. A.	Minneapolis	Olson, F. A.	Minneapolis
Gronvall, P. R.	Minneapolis	Lapierre, J. T.	Minneapolis	Olson, O. A.	Minneapolis
Gunderson, N. A.	Minneapolis	Larsen, F. W.	Minneapolis	Olson, R. G.	Minneapolis
Gustason, H. T.	Minneapolis	Larson, C. M.	Minneapolis	Oppen, E. G.	Minneapolis
Hacking, F. H.	Minneapolis	Larson, L. M.	Minneapolis	Owre, Oscar	Minneapolis
Haggard, G. D.	Minneapolis	Larson, P. N.	Minneapolis	Parks, A. H.	Minneapolis
Hall, J. M.	Minneapolis	Laurent, A. A.	Minneapolis	Patterson, W. E.	Minneapolis
Hallberg, C. A.	Minneapolis	LaVake, R. T.	Minneapolis	Paulsen, E. L.	Minneapolis
Hamel, A. L.	Minneapolis	Laymon, C. W.	Minneapolis	Pearce, N. O.	Minneapolis
Hamilton, A. S.	Minneapolis	Lazar, H. L.	Minneapolis	Pederson, R. M.	Minneapolis
Hamlin, G. B.	Minneapolis	Leavitt, H. H.	Minneapolis	Pennington, Reuben	Minneapolis
Hannah, H. B.	Minneapolis	Lebowski, J. A.	Minneapolis	Peppard, T. A.	Minneapolis
Hansen, E. W.	Minneapolis	Lee, H. M.	Minneapolis	Perry, R. St. J.	Minneapolis
Hansen, Olga S.	Minneapolis	Leland, H. R.	Minneapolis	Petersen, J. R.	Minneapolis
Hanson, H. J.	Minneapolis	Lenz, O. A.	Minneapolis	Petersen, Thorvald	Minneapolis
Hanson, H. V.	Minneapolis	Leonard, L. J.	Minneapolis	Peterson, Henry	Minneapolis
Hanson, W. A.	Minneapolis	Leonard, Sam	Minneapolis	Peterson, H. W.	Minneapolis
Harrington, C. D.	Minneapolis	Levine, N. M.	Minneapolis	Peterson, N. P.	Minneapolis
Harrington, F. E.	Minneapolis	Lillehei, E. J.	Robbinsdale	Peterson, O. H.	Minneapolis
Harrison, W. C.	Minneapolis	Lind, C. J.	Minneapolis	Peterson, P. E.	Minneapolis
Hart, V. L.	Minneapolis	Lindquist, R. H.	Minneapolis	Peterson, W. C.	Minneapolis
Hartzell, T. B.	Minneapolis	Linner, H. P.	Minneapolis	Pettit, L. J.	Minneapolis
Hastings, D. R.	Minneapolis	Linton, W. B.	Minneapolis	Pettit, C. K.	Oak Terrace
Haugen, J. A.	Minneapolis	Lipschultz, Oscar	Minneapolis	Pettit, C. W.	Minneapolis
Haverfield, Addie R.	Minneapolis	Litman, A. B.	Minneapolis	Peyton, W. T.	Minneapolis
Hawkinson, R. P.	Robbinsdale	Litzenberg, J. C.	Minneapolis	Pfunder, M. C.	Minneapolis
Hayes, J. M.	Minneapolis	Logefeil, R. C.	Minneapolis	Phelps, K. A.	Minneapolis
Head, D. P.	Minneapolis	Long, Jesse	Minneapolis	Platou, E. S.	Minneapolis
Head, G. D.	Minneapolis	Loomis, E. A.	Minneapolis	Pollack, D. K.	Minneapolis
Headback, A. E.	Minneapolis	Lundblad, R. A.	Minneapolis	Pollard, D. W.	Minneapolis
Heim, R. R.	Minneapolis	Lundgren, A. C.	Minneapolis	Polzak, J. A.	Minneapolis
Helk, H. H.	Minneapolis	Lundquist, E. F.	Minneapolis	Poppe, F. H.	Minneapolis
Hendrickson, J. F.	Minneapolis	Lynch, M. J.	Minneapolis	Pratt, F. J.	Minneapolis
Henrikson, E. C.	Minneapolis	Lyon, E. P.	Minneapolis	Pratt, J. A.	Minneapolis
Henry, C. E.	Minneapolis	Lysne, Henry	Minneapolis	Preine, I. A.	Minneapolis
Henry, M. O.	Minneapolis	MacDonald, A. E.	Minneapolis	Prim, J. A.	Minneapolis
Herbolsheimer, A. J.	Minneapolis	MacDonald, D. A.	Minneapolis	Proshok, C. E.	Minneapolis
Herman, A. L.	Minneapolis	MacDonald, I. C.	Minneapolis	Quinby, T. F.	Minneapolis
Hiebert, J. P.	Minneapolis	Mach, F. B.	Minneapolis	Quist, H. W.	Minneapolis
Higgins, J. H.	Minneapolis	Macnie, J. S.	Minneapolis	Rasmussen, R. C.	St. Paul
Hill, E. J.	Minneapolis	Makarov, W. N.	Minneapolis	Reed, C. A.	Minneapolis
Hirschfelder, A. D.	Minneapolis	Makara, C. O.	Minneapolis	Regnier, E. A.	Minneapolis
Hirschfield, F. R.	Minneapolis	Marcey, W. J.	Minneapolis	Reimann, H. A.	Minneapolis
Hoglund, A. W.	Minneapolis	Mariette, E. S.	Oak Terrace	Reynolds, J. S.	Minneapolis
Hobbs, C. A.	Minneapolis	Mark, D. B.	Minneapolis	Rice, C. O.	Minneapolis
Hodge, S. V.	Minneapolis	Martinson, C. J.	Wayzata	Richardson, F. S.	Minneapolis
Hoeffert, H. E.	Minneapolis	Matchan, G. R.	Minneapolis	Richdorf, L. F.	Minneapolis
Holl, P. M.	Minneapolis	Matthews, Justus	Minneapolis	Rieke, W. W.	Wayzata
Holt, W. B.	Minneapolis	Mattill, P. M.	Oak Terrace	Rigler, L. G.	Minneapolis
Howard, W. H.	Minneapolis	Mattson, Hamlin	Minneapolis	Rishmiller, J. H.	Minneapolis
		Maxeiner, S. R.	Minneapolis	Rizer, R. I.	Minneapolis
				Roan, C. M.	Minneapolis

ROSTER MINNESOTA STATE MEDICAL ASSOCIATION

Robb, E. F.	Minneapolis	Siperstein, D. M.	Minneapolis	Urner, J. A.	Minneapolis
Roberts, Stanley W.	Minneapolis	Sivertsen, Ivar	Minneapolis	Voyer, E. O.	Minneapolis
Roberts, T. S.	Minneapolis	Skjold, A. C.	Minneapolis	Wahlquist, H. F.	Minneapolis
Roberts, W. B.	Minneapolis	Sloan, Julius	Minneapolis	Waldron, C. W.	Minneapolis
Robitshek, E. C.	Minneapolis	Sloan, L. N.	Minneapolis	Wall, C. R.	Minneapolis
Rochford, W. E.	Minneapolis	Smisek, F. M.	Minneapolis	Wangensteen, O. H.	Minneapolis
Rodda, F. C.	Minneapolis	Smith, A. E.	Minneapolis	Wanous, E. Z.	Minneapolis
Rosen, Samuel	Minneapolis	Smith, A. M.	Minneapolis	Ward, A. W.	Minneapolis
Rosenwald, R. M.	Minneapolis	Smith, H. R.	Minneapolis	Ward, P. A.	Minneapolis
Rucker, C. W.	Minneapolis	Smith, N. M.	Minneapolis	Warham, T. T.	Minneapolis
Rucker, W. H.	Minneapolis	Soerlind, R. T.	Minneapolis	Watson, J. A.	Minneapolis
Rud, N. E.	Minneapolis	Solhaug, S. B.	Minneapolis	Webb, R. C.	Minneapolis
Rudell, G. L.	Minneapolis	Spano, J. P.	Minneapolis	Weisman, S. A.	Minneapolis
Rupp, Alice	East Cleveland, Ohio	Sperling, Louis	Minneapolis	Westman, R. T.	Minneapolis
Russeth, A. N.	Minneapolis	Spratt, C. N.	Minneapolis	Wethall, A. G.	Minneapolis
Rusten, E. M.	Minneapolis	Stelter, L. A.	Minneapolis	Wetherby, Macnider	Minneapolis
Sadler, W. P.	Minneapolis	Stenstrom, Annette T.	Minneapolis	Weum, T. W.	Minneapolis
St. Cyr, K. J.	Osseo	Stewart, C. A.	Minneapolis	White, A. T.	Minneapolis
Saliterman, B. I.	Minneapolis	Stewart, R. L.	Minneapolis	White, S. M.	Minneapolis
Salt, C. G.	Minneapolis	Stomel, Joseph	Minneapolis	White, W. D.	Minneapolis
Samuelson, Samuel	Minneapolis	Strachauer, A. C.	Minneapolis	Whitesell, L. A.	Minneapolis
Sawatzky, W. A.	Minneapolis	Strout, E. S.	Minneapolis	Widen, W. F.	Minneapolis
Schaa, F. H. G.	Minneapolis	Strout, G. E.	Minneapolis	Wiese, H. F. B.	Minneapolis
Schaefer, W. K.	Minneapolis	Sturre, J. R.	Minneapolis	Wilcox, A. E.	Minneapolis
Scheldrup, N. H.	Minneapolis	Sullivan, R. M.	Minneapolis	Wildner, R. L.	Minneapolis
Scherer, L. R.	Minneapolis	Sundt, Mathias	Minneapolis	Wilken, P. A.	Minneapolis
Schmitt, A. F.	Minneapolis	Swanson, Cephas	Minneapolis	Willcutt, C. E.	Minneapolis
Schmitt, S. C.	Minneapolis	Swanson, R. E.	Minneapolis	Williams, Robert	Minneapolis
Schneider, J. P.	Minneapolis	Sweetser, H. B., Jr.	Minneapolis	Winer, L. H.	Minneapolis
Schottler, M. E.	Minneapolis	Sweetser, H. B., Sr.	Minneapolis	Winther, Nora M. C.	Minneapolis
Schultz, P. J.	Minneapolis	Sweetser, T. H.	Minneapolis	Witham, C. A.	Minneapolis
Schussler, O. F.	Minneapolis	Sweitzer, S. E.	Minneapolis	Wittich, F. W.	Minneapolis
Schwartz, V. J.	Minneapolis	Swendseen, C. G.	Minneapolis	Wohlraabe, A. A.	Minneapolis
Schwytzer, Gustav	Minneapolis	Ternstrom, O. H.	Minneapolis	Wohlraabe, C. F.	Minneapolis
Scott, F. H.	Minneapolis	Thomas, G. E.	Minneapolis	Woodworth, Elizabeth	Minneapolis
Scott, H. G.	Minneapolis	Thomas, G. H.	Minneapolis	Wright, C. B.	Minneapolis
Seashore, Gilbert	Minneapolis	Thomas, G. J.	Minneapolis	Wright, C. D.	Minneapolis
Seham, Max	Minneapolis	Tingdale, A. C.	Minneapolis	Wright, F. R.	Minneapolis
Siefert, M. H.	Excelsior	Trueman, A. S.	Minneapolis	Wyatt, O. S.	Minneapolis
Sellesteth, I. F.	Minneapolis	Tunsted, H. J.	Minneapolis	Wynne, H. M. N.	Minneapolis
Shapiro, M. J.	Minneapolis	Turnecliff, D. D.	Minneapolis	Ylvisaker, R. S.	Minneapolis
Siegmann, W. C.	Minneapolis	Tyrrrell, C. C.	Minneapolis	Yoerg, O. W.	Minneapolis
Silver, J. D.	Minneapolis	Ude, W. H.	Minneapolis	Zaworski, E. A.	Minneapolis
Simons, J. H.	Minneapolis	Ulrich, H. L.	Minneapolis	Zierold, A. A.	Minneapolis
Simpson, E. D.	Minneapolis	Undine, C. A.	Minneapolis	Ziskin, Thomas	Minneapolis

KANDIYOHI-SWIFT-MEEKER COUNTY MEDICAL SOCIETY

Regular meetings, third Wednesday of month
Annual meeting, December

Number of Members: 31

President	Danielson, K. A.	Litchfield	Jacobs, D. C.	Willmar
Macklin, W. E.	Danielson, Lennox	Litchfield	Jacobs, J. C.	Willmar
Secretary	Dowswell, W. J.	Kerkhoven	Jensen, H. H.	Atwater
Scofield, C. L.	Edwards, G. C.	Grove City	Johnson, Hans	Kerkhoven
Anderson, R. E.	Fiksdahl, M. J.	Willmar	Kaufman, W. C.	Appleton
Arnson, J. M.	Fredrickson, Alice C.	Lake Lillian	Macklin, W. E., Jr.	Litchfield
Behmler, F. W.	Fredrickson, G. U. Y.	Lake Lillian	Noble, J. L.	Willmar
Branton, A. F.	Frisch, F. P.	Willmar	O'Connor, D. C.	Eden Valley
Branton, B. J.	Frost, E. H.	Willmar	Petersen, M. C.	Willmar
Brigham, Frank	Giere, S. W.	Benson	Scofield, C. L.	Benson
Daignault, Oscar	Hodapp, R. J.	Willmar	Telford, V. I.	Litchfield
	Hutchinson, Henry	Willmar	Wilmot, H. E.	Litchfield

LYON-LINCOLN COUNTY MEDICAL SOCIETY

Annual meeting, October

Number of Members: 22

President	Gray, F. D.	Marshall	Robertson, J. B.	Minneapolis
Monson, L. J.	Happe, L. J.	Marshall	Sanderson, E. T.	Minneota
Secretary	Helferty, J. K.	Tracy	Schmidt, P. G.	Cottonwood
Workman, H. M.	Hermanson, P. E.	Hendricks	Thordarson, Theodore	Minneota
Bossingham, O. N.	Hoidale, A. D.	Tracy	Vadheim, A. L.	Tyler
Ford, B. C.	Jacquot, G. L.	Marshall	Valentine, W. H.	Tracy
Germo, Charles	Monson, L. J.	Hendricks	Workman, H. M.	Tracy
Golden, C. M.	Persons, C. E.	Marshall	Workman, W. G.	Tracy
	Purves, G. H.	Russell	Yaeger, W. W.	Ivanhoe

McLEOD COUNTY MEDICAL SOCIETY

Regular meetings, Quarterly or at call of President

Annual meeting, January or February

Number of Members: 19

President	Holm, H. H.	Glencoe	Rempel, D. D.	Brownston
Fine, B. A.	Jensen, A. H.	Hutchinson	Sahr, W. G.	Hutchinson
Secretary	Jensen, A. M.	Brownston	Scholpp, O. W.	Hutchinson
Goss, H. C.	Klima, W. W.	Stewart	Sheppard, Fred.	Hutchinson
Clement, J. B.	Langhoff, A. H.	Glencoe	Sheppard, P. E.	Hutchinson
Fine, B. A.	Lippmann, E. W.	Hutchinson	Schmidt, W. R.	Glencoe
Goss, H. C.	McMahon, M. J.	Green Isle	Tinker, C. W.	Stewart
	Ninneman, N. N.	Silver Lake	Trutna, T. J.	Silver Lake

MOWER COUNTY MEDICAL SOCIETY

Regular meetings, last Thursday each month except June, July and August

Annual meeting, last Thursday in November

Number of Members: 24

President	Flanagan, L. G.	Austin	McKenna, J. K.	Austin
McKenna, J. K.	Greene, H. H.	Austin	Melzer, G. R.	Lyle
Secretary	Grise, W. B.	Austin	Mitchell, R. S.	Grand Meadow
Robertson, P. A.	Havens, J. G. W.	Austin	Morrow, J. J.	Austin
Allen, A. W.	Hegge, O. H.	Austin	Morse, M. P.	Le Roy
Allen, C. C.	Hegge, R. S.	Austin	Robertson, P. A.	Austin
Anderson, U. S.	Henslin, A. E.	Le Roy	Schneider, P. J.	Adams
Cronwell, B. J.	Hertel, G. E.	Austin	Sheedy, C. L.	Austin
	Leck, P. C.	Austin	Schottler, G. J.	Dexter
	Lommen, P. A.	Austin	Thomson, J. M.	Brownsdale

ROSTER MINNESOTA STATE MEDICAL ASSOCIATION

NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY Regular meetings, first Tuesday, April, September, and December Annual meeting, December Number of Members: 16

President
Strathern, F. P. St. Peter
Secretary
Ericson, Swan Le Sueur
Aitkens, H. B. Le Center
Covell, W. W. St. Peter

Curtis, R. A. Le Center
Ericson, Swan Le Sueur
Freeman, G. H. St. Peter
Gully, R. J. St. Peter
Hiniker, P. J. Le Sueur
Holten, Theodore Waterville
Kerschbaumer, Louisa St. Peter

Kolars, J. J. Le Center
Lenander, M. E. St. Peter
Nilson, H. J. North Mankato
Sonnesyn, N. N. Le Sueur
Strathern, F. P. St. Peter
Traxler, F. J. Henderson
Wolner, O. H. St. Peter

OLMSTED-HOUSTON-FILLMORE-DODGE COUNTY MEDICAL SOCIETY Regular meetings, first Wednesday every odd month Annual meeting, first Wednesday in November Number of Members: 291

President
Mayo, C. W. Rochester
Secretary
Piper, M. C. Rochester

Adson, A. W. Rochester
Allen, E. V. Rochester
Alvarez, W. C. Rochester
Amberg, Samuel Rochester
Anderson, C. M. Rochester
Anderson, M. J. Rochester
Anderson, N. E. Harmony
Anderson, N. H. Spring Valley
Annis, J. W. Rochester
Armstrong, T. D. Rochester
Baggenstoss, A. H. Rochester
Bailey, R. J. Rochester
Bair, H. L. Rochester
Baird, L. W. Rochester
Baker, C. P. Rochester
Baker, G. S. Rochester
Baker, H. R. Hayfield
Baker, T. W. Rochester
Balfour, D. C. Rochester
Bannick, E. G. Rochester
Bargen, J. A. Rochester
Barker, N. W. Rochester
Barnes, A. R. Rochester
Bedard, R. E. Rochester
Behrend, Albert Rochester
Beiswanger, R. H. Wykoff
Belote, G. B. Caledonia
Benedict, W. L. Rochester
Berkman, D. M. Rochester
Berkman, J. M. Rochester
Betlach, C. J. Rochester
Bigelow, C. E. Dodge Center
Binger, M. W. Rochester
Blake, T. W. Rochester
Blum, B. B. Rochester
Boothby, W. M. Rochester
Bowling, H. H. Rochester
Braasch, W. F. Rochester
Brink, J. R. Rochester
Brown, A. E. Rochester
Brown, P. W. Rochester
Brunsting, H. A. Rochester
Brunsting, L. A. Rochester
Buchstein, H. F. Rochester
Buchtel, H. A. Rochester
Buie, L. A. Rochester
Burch, H. A. Rochester
Butsch, W. L. Rochester
Butt, H. R. Rochester
Cabot, Hugh Rochester
Camp, J. D. Rochester
Canfield, W. W. Houston
Carlson, L. A. Rochester
Carmichael, F. A., Jr. Rochester
Clagett, O. T. Rochester
Clark, L. W. Spring Valley
Clark, R. L., Jr. Rochester
Clifton, T. A. Chatfield
Coffey, R. J. Rochester
Comfort, M. W. Rochester
Conner, H. M. Rochester
Cook, E. N. Rochester
Counseller, V. S. Rochester
Cragg, R. W. Rochester
Craig, W. McK. Rochester
Crenshaw, J. L. Rochester
Crew, J. E. Rochester
Cusick, P. L. Rochester
Davenport, L. H. Rochester
Davis, A. C. Rochester
Davis, I. G. Rushford
Desjardins, A. U. Rochester
Dietrich, F. S., Jr. Rochester
Dixon, C. F. Rochester
Dolder, F. C. Rochester
Drake, F. A. Eyota
Drips, Della G. Lanesboro
Dry, T. J. Rochester
Eaton, L. McK. Rochester

Edward, George Canton
Emmett, J. L. Rochester
Erich, J. B. Rochester
Erickson, C. W. Rochester
Eusterman, G. B. Rochester
Everts, A. B. Rochester
Faber, J. E. Rochester
Famiglietti, E. V. Rochester
Fatherree, T. J., Jr. Rochester
Fawcett, C. E. Stewartville
Figi, F. A. Rochester
Fisher, Laura M. Rochester
Foley, M. P. Rochester
Foster, F. P. Rochester
Fricke, R. E. Rochester
Fuller, Alice H. Rochester
Gaarde, F. W. Rochester
Ghormley, R. K. Rochester
Gibson, W. R. Rochester
Giffin, H. Z. Rochester
Gillespie, D. L. Rochester
Gilpin, S. F., Jr. Rochester
Goldsmith, Grace A. Rochester
Gray, H. K. Rochester
Griffin, A. M. Rochester
Gunderson, H. J. Rochester
Gurney, C. E. Rochester
Habein, H. C. Rochester
Haines, S. F. Rochester
Hale, D. E. Rochester
Hall, B. E. Rochester
Hallenbeck, D. F. Rochester
Harrington, S. W. Rochester
Hartman, H. R. Rochester
Havens, F. Z. Rochester
Hebert, W. H. J. Rochester
Heck, F. L. Rochester
Heilman, F. R. Rochester
Helland, G. M. Spring Grove
Holland, J. W. Spring Grove
Helmholz, H. F. Rochester
Hempstead, B. E. Rochester
Hench, P. S. Rochester
Henderson, M. S. Rochester
Herrell, W. E. Rochester
Hertzog, A. J. Rochester
Hewitt, Edith S. Rochester
Hewitt, R. M. Rochester
Heverdale, O. C. Rochester
Hill, E. M. Big Timber, Montana
Hines, E. A., Jr. Rochester
Hinshaw, H. C. Rochester
Horton, B. T. Rochester
Howell, L. P. Rochester
Hubly, J. W. Rochester
Hunt, A. B. Rochester
Jackman, R. J. Rochester
Johnson, H. P. Harmony
Johnson, R. B. Lanesboro
Jones, H. M. Rochester
Joyce, G. L. Stewartville
Joyce, G. T. Rochester
Kaump, D. H. Rochester
Keith, N. M. Rochester
Kemble, J. W. Rochester
Kennedy, R. L. J. Rochester
Kepner, E. J. Rochester
Kernohan, J. W. Rochester
Kirklin, B. R. Rochester
Kirklin, O. L. Rochester
Knepper, P. G. Rochester
Koelsche, G. A. Rochester
Kroeze, R. G. Rochester
Krusen, F. H. Rochester
Lannin, J. C. Mabel
Liddy, E. T. Rochester
Lemon, R. G. Rochester
Lemon, W. S. Rochester
Lenton, H. P. Rochester
Leser, R. U. Rochester
Lewis, E. B. Rochester
Lillie, H. I. Rochester
Lothead, D. C. Rochester
Logan, A. H. Rochester
Love, J. G. Rochester

Luden, Georgine Victoria, B. C., Can.
Lundy, J. S. Rochester
Macey, H. B. Rochester
Magath, T. B. Rochester
Magiera, Estelle A. Rochester
Malerich, J. A. Caledonia
Mann, F. C. Rochester
Marley, D. M. Rochester
Masson, D. M. Rochester
Masson, J. C. Rochester
Mayo, C. H. Rochester
Mayo, C. W. Rochester
Mayo, J. G. Rochester
Mayo, W. J. Rochester
Maytum, C. K. Rochester
McCart, W. C. Rochester
McDonald, J. R. Rochester
McGowan, J. M. Rochester
McKaig, C. B. Pine Island
McKechnie, R. E. Rochester
McKean, R. S. Rochester
McLean, A. R. Rochester
McTamaney, R. A. Rochester
Meyerding, H. W. Rochester
Mills, J. H. Rochester
Moersch, F. P. Rochester
Moersch, H. J. Rochester
Montgomery, Hamilton Rochester
Morlock, C. G. Rochester
Mulrooney, R. E. Rochester
Mussey, R. D. Rochester
Nass, H. A. Mabel
Nesselrod, J. P. Rochester
Nettrou, W. S. Rochester
New, G. B. Rochester
Odel, H. M. Rochester
O'Leary, P. A. Rochester
Olson, E. A. Pine Island
Olson, P. F. Rochester
O'Neal, B. L. Rochester
Ongard, L. K., Jr. Houston
Ongard, L. K., Sr. Houston
Pace, J. McI. Haskell, Texas
Parker, R. L. Rochester
Parkhill, Edith M. Rochester
Pemberton, J. deJ. Rochester
Peterson, D. L. Rochester
Pitcher, Frederick, Jr. Rochester
Piper, M. C. Rochester
Plummer, H. S. Rochester
Plummer, W. A. Rochester
Pollock, L. W. Rochester
Pool, T. L. Rochester
Popp, W. C. Rochester
Powell, W. N. Rochester
Powers, F. H. Rochester
Prangan, A. D. Rochester
Prickman, L. E. Rochester
Priestley, J. T. Rochester
Raaf, J. E. Rochester
Randall, L. M. Rochester
Rhorer, R. J. Rochester
Rivers, A. B. Rochester
Robertson, H. E. Rochester
Robinson, V. C. Rochester
Rosenow, E. C. Rochester
Rozendaal, H. M. Rochester
Ryneason, E. H. Rochester
Sanford, A. H. Rochester
Saunders, T. S., Jr. Rochester
Scherer, R. G. Dubuque, Iowa
Schmidt, H. W. Rochester
Schulhof, M. G. Rochester
Searles, P. W. Rochester
Secord, E. W. Rochester
Sheldon, W. D. Rochester
Shoemaker, Rosemary Rochester
Simonton, K. M. Rochester
Sloumb, C. H. Rochester
Smith, B. F. Rochester
Smith, F. D. Kasson
Smith, F. L. Rochester
Smith, H. L. Rochester
Smith, N. D. Rochester

ROSTER MINNESOTA STATE MEDICAL ASSOCIATION

Snell, A. M. Rochester
 Soderstrom, Edwin Rochester
 Sowers, B. F. Rochester
 Stalker, L. K. Rochester
 Steenrod, E. J. Rochester
 Stickney, J. M. Rochester
 Strohl, E. L. Rochester
 Stuhler, L. G. Rochester
 Sullivan, R. R. Rochester
 Sutherland, C. G. Rochester
 Teem, M. Van B. Rochester
 Thiessen, N. W. Rochester
 Thompson, G. J. Rochester
 Tierney, C. M. Harmony
 Tillisch, J. H. Rochester

Tovell, R. M. Rochester
 Tuohy, E. B. Rochester
 Turnbull, Andrew Rochester
 Vinson, P. P. Rochester
 Wagener, H. P. Rochester
 Wakefield, E. G. Rochester
 Walters, Waltman Rochester
 Ward, C. E. Rochester
 Watkins, C. H. Rochester
 Waugh, J. M. Rochester
 Weber, H. M. Rochester
 Weir, J. F. Rochester
 Welch, C. S. Rochester
 Wellbrock, W. L. A. Rochester

Welsh, A. L. Rochester
 Wesson, H. R. Rochester
 Wilbur, D. L. Rochester
 Wilder, R. M. Rochester
 Whittaker, L. D. Rochester
 Williams, R. V. Rushford
 Willius, F. A. Rochester
 Wilson, L. B. Rochester
 Wolff, L. H. Rochester
 Wolftman, H. W. Rochester
 Wood, H. G. Rochester
 Woodruff, C. W. Chatfield
 Zellhoefer, H. W. K. Rochester
 Zide, H. A. Rochester

PARK REGION DISTRICT AND COUNTY MEDICAL SOCIETY

Douglas, Grant, Otter Tail and Wilkin Counties
 Regular meetings, Second Wednesday every even month
 Annual meeting, December
 Number of Members: 53

President
 Drought, W. W. Fergus Falls

Secretary
 Baker, N. H. Fergus Falls

Arndt, H. W. Frazee
 Baker, A. C. Fergus Falls
 Baker, N. H. Fergus Falls
 Bergquist, K. E. Battle Lake
 Blakey, A. R. Osakis
 Boline, C. A. Battle Lake
 Boyd, L. M. Alexandria
 Boysen, Peter Pelican Rapids
 Broker, W. S. Battle Lake
 Burnap, W. L. Fergus Falls
 Clifford, G. W. Osakis
 Combacker, L. C. Fergus Falls
 Cowing, P. G. Evansville

Drought, W. W. Fergus Falls
 Esser, John. Perham
 Estrem, C. O. Fergus Falls
 Gardner, W. P. Fergus Falls
 Gronewald, Tula W. Fergus Falls
 Hanson, E. C. New York Mills
 Hand, W. R. Elbow Lake
 Haskell, A. D. Alexandria
 Heiberg, E. A. Fergus Falls
 Hodgson, C. H. Fergus Falls
 Jacobs, G. C. Fergus Falls
 Johnson, O. V. Fergus Falls
 Katzberg, L. W. Fergus Falls
 Kierland, P. E. Alexandria
 Lee, W. A. Fergus Falls
 Leibold, H. H. Parkers Prairie
 Lewis, A. Henning
 Love, F. A. Carlos
 Lund, C. J. T. Underwood
 Meckstroth, C. W. Brandon

Miller, W. A. New York Mills
 Naegeli, Frank Fergus Falls
 Nelson, W. I. Minneapolis
 Otto, H. C. Frazee
 Parson, Lillian B. Elbow Lake
 Parson, L. R. Elbow Lake
 Patterson, W. L. Fergus Falls
 Paulson, T. S. Fergus Falls
 Powers, F. W. Barret
 Randall, A. M. Ashby
 Reeve, E. T. Elbow Lake
 Rimer, E. W. Breckenridge
 Satersmoen, Theodore Pelican Rapids
 Sather, E. R. Alexandria
 Serkland, J. C. Rothsay
 Steube, R. W. Alexandria
 Sutton, H. R. Hoffman
 Tanquist, E. J. Alexandria
 Vail, J. B. Henning
 Wray, W. E. Campbell

RAMSEY COUNTY MEDICAL SOCIETY

Regular meetings, last Monday in every month excepting June, July, August
 Annual meeting, last Monday in January
 Number of Members: 334

President
 Schulze, A. G. St. Paul
 Secretary
 Hultkrans, J. C. St. Paul

Abbott, J. S. St. Paul
 Ahrens, A. E. St. Paul
 Ahrens, A. H. St. Paul
 Alberts, M. W. St. Paul
 Alden, J. F. St. Paul
 Alexander, F. H. St. Paul
 Armstrong, J. M. St. Paul
 Arnquist, A. S. St. Paul
 Aurelius, J. R. St. Paul
 Ausman, C. F. St. Paul
 Backus, A. S. St. Paul
 Bacon, D. K. St. Paul
 Bacon, L. C. St. Paul
 Barry, L. W. St. Paul
 Barsness, Nellie. St. Paul
 Beadie, W. D. Cannon Falls
 Beals, Hugh St. Paul
 Beek, H. O. St. Paul
 Bell, C. C. St. Paul
 Benep, J. L. St. Paul
 Pennion, P. H. St. Paul
 Bentley, N. P. St. Paul
 Berrisford, P. D. St. Paul
 Bieck, J. F. St. Paul
 Binger, H. E. St. Paul
 Birnberg, T. L. St. Paul
 Bock, R. A. St. Paul
 Boeckmann, Egil. St. Paul
 Bohland, E. H. St. Paul
 Bolander, H. L. St. Paul
 Borg, J. F. St. Paul
 Bruma, L. R. St. Paul
 Brand, G. D. St. Paul
 Bray, E. R. St. Paul
 Briggs, J. F. St. Paul
 Brodie, W. D. St. Paul
 Brown, E. I. St. Paul
 Brown, J. C. St. Paul
 Bulinski, T. J. St. Paul
 Burch, F. E. St. Paul
 Burns, R. M. St. Paul
 Purton, C. G. St. Paul
 Busher, H. H. St. Paul
 Caldwell, J. P. St. Paul
 Campbell, J. E. South St. Paul
 Carroll, W. C. St. Paul

Chatterton, C. C. St. Paul
 Christiansen, A. St. Paul
 Christison, J. T. St. Paul
 Clark, T. C. Minneapolis
 Colby, Woodard St. Paul
 Cole, W. H. St. Paul
 Collie, H. G. St. Paul
 Colvin, A. R. St. Paul
 Connor, C. E. St. Paul
 Cook, C. K. St. Paul
 Countryman, R. S. St. Paul
 Cowern, E. W. North St. Paul
 Critchfield, L. R. St. Paul
 Culligan, J. M. St. Paul
 Dack, L. G. St. Paul
 Darling, J. B. St. Paul
 Daugherty, E. B. St. Paul
 Daugherty, L. E. St. Paul
 Davis, Herbert St. Paul
 Davis, William St. Paul
 Dedolph, Karl St. Paul
 Delavan, P. A. St. Paul
 Derauf, B. I. St. Paul
 Dickson, T. H., Jr. St. Paul
 Dittman, G. C. St. Paul
 Donohue, P. F. St. Paul
 Dovre, C. M. St. Paul
 Drake, C. B. St. Paul
 Dunn, J. N. St. Paul
 Earl, G. A. St. Paul
 Earl, Robert St. Paul
 Ellund, G. St. Paul
 Ely, O. S. South St. Paul
 Emerson, E. C. St. Paul
 Endress, E. K. St. Paul
 Engberg, E. J. St. Paul
 Ernest, G. C. St. Paul
 Eshelby, E. C. St. Paul
 Fahey, E. W. St. Paul
 Ferguson, J. C. St. Paul
 Fesler, H. H. St. Paul
 Flanagan, H. F. St. Paul
 Fogarty, C. W. St. Paul
 Fogelberg, E. J. St. Paul
 Foley, F. E. B. St. Paul
 Freeman, C. D. St. Paul
 Gager, E. C. St. Paul
 Garbrecht, Arthur St. Paul
 Gardiner, D. G. St. Paul
 Geer, E. K. St. Paul
 Gehlen, J. M. St. Paul
 Geist, G. A. St. Paul
 Ghent, C. H. St. Paul

Ghent, M. M. St. Paul
 Gibbs, E. C. St. Paul
 Gilfillan, J. S. St. Paul
 Ginsberg, S. T. St. Paul
 Ginsberg, Wm. St. Paul
 Goltz, E. V. St. Paul
 Grant, H. W. St. Paul
 Gratzek, Thomas St. Paul
 Gruenhagen, A. P. St. Paul
 Hagaman, G. K. St. Paul
 Hall, A. R. St. Paul
 Hall, H. H. St. Paul
 Hammes, E. M. St. Paul
 Hammond, J. F. St. Paul
 Harmon, G. E. St. Paul
 Hartfiel, W. F. St. Paul
 Hartley, E. C. St. Paul
 Hassett, M. F. St. Paul
 Hauser, V. P. St. Paul
 Hawkins, V. J. St. Paul
 Heath, A. C. Stillwater
 Heck, W. W. St. Paul
 Hedestrom, F. G. St. Paul
 Hengstler, W. H. St. Paul
 Hensel, C. N. St. Paul
 Heron, R. C. St. Paul
 Herrmann, E. T. St. Paul
 Hesselgrave, S. S. St. Paul
 Hilger, A. W. St. Paul
 Hilger, D. D. St. Paul
 Hilger, L. A. St. Paul
 Hiniker, L. P. St. Paul
 Hochfilzer, J. J. St. Paul
 Hoff, Alfred St. Paul
 Hoffman, M. H. St. Paul
 Holcomb, J. T. St. Paul
 Holcomb, O. W. St. Paul
 Holt, J. E. St. Paul
 Howard, M. A. St. Paul
 Howard, W. S. St. Paul
 Hullsiek, R. B. St. Paul
 Hultkrans, J. C. St. Paul
 Ide, A. W. St. Paul
 Ikeda, Kano. St. Paul
 Ingerson, C. A. St. Paul
 Jesion, J. W. St. Paul
 Johanson, W. G. St. Paul
 Johnson, A. M. St. Paul
 Johnson, J. A. St. Paul
 Johnson, R. G. St. Paul
 Johnson, T. H. San Francisco, Calif.
 Jones, D. C. St. Paul
 Jones, E. M. St. Paul

ROSTER MINNESOTA STATE MEDICAL ASSOCIATION

Kadesky, David . . . San Francisco, Calif.
 Kamman, G. R. . . . St. Paul
 Kannary, E. L. . . . St. Paul
 Kaplan, D. H. . . . St. Paul
 Kasper, E. M. . . . St. Paul
 Kelly, J. V. . . . St. Paul
 Kelly, P. H. . . . St. Paul
 Kenefick, E. V. . . . St. Paul
 Kennedy, W. A. . . . St. Paul
 Kesting, Herman . . . St. Paul
 King, G. L. . . . St. Paul
 King, Z. P. . . . St. Paul
 Klein, H. N. . . . St. Paul
 Knauff, M. K. . . . St. Paul
 Kugler, A. A. . . . St. Paul
 Kvitrud, Gilbert . . . St. Paul
 Langenderfer, F. V. . . . St. Paul
 Larsen, C. L. . . . St. Paul
 Lax, M. H. . . . St. Paul
 Leahy, Bartholomew . . . St. Paul
 Leavenworth, R. O. . . . St. Paul
 Lee, S. R. . . . St. Paul
 Leitch, Archibald . . . St. Paul
 Leonard, G. J. . . . Hastings
 Lepak, J. A. . . . St. Paul
 Lerche, William . . . Cable, Wis.
 Leven, N. Logan . . . St. Paul
 Levin, Bert . . . St. Paul
 Lick, C. L. . . . St. Paul
 Lippman, H. S. . . . St. Paul
 Little, W. J. . . . St. Paul
 Livingstone, J. W. . . . Hudson, Wis.
 Lowe, E. R. . . . South St. Paul
 Lowe, T. A. . . . South St. Paul
 Lundholm, A. M. . . . St. Paul
 Lynch, F. W. . . . St. Paul
 Madden, J. F. . . . St. Paul
 Markoe, J. C. . . . St. Paul
 Martineau, J. L. . . . St. Paul
 Mattson, C. H. . . . St. Paul
 McCarthy, J. J. . . . St. Paul
 McCarthy, W. R. . . . St. Paul
 McClanahan, J. H. . . . White Bear
 McClanahan, T. S. . . . White Bear
 McLaren, Jennette M. . . . St. Paul
 McNevin, C. I. . . . St. Paul
 Meade, J. R. . . . St. Paul
 Mears, B. J. . . . St. Paul
 Meyerding, E. A. . . . St. Paul
 Moga, J. A. . . . St. Paul
 Mogilner, S. N. . . . St. Paul
 Molander, H. A. . . . St. Paul
 Moquin, Marie A. . . . St. Paul
 Moran, T. R. . . . St. Paul
 Moriarty, Berenice . . . St. Paul
 Morrissey, F. B. . . . St. Paul
 Mortenson, N. G. . . . St. Paul
 Moss, M. N. . . . St. Paul

Moynihan, T. J. . . . St. Paul
 Muller, R. T. . . . St. Paul
 Myers, Thomas . . . St. Paul
 Naegeli, A. E. . . . St. Paul
 Naslund, A. W. . . . St. Paul
 Neher, F. H. . . . St. Paul
 Nelson, L. A. . . . St. Paul
 Nichols, A. E. . . . St. Paul
 Nippert, H. T. . . . St. Paul
 Noble, J. F. . . . St. Paul
 Nye, Katherine A. . . . St. Paul
 Nye, Lillian L. . . . St. Paul
 O'Connor, L. J. . . . St. Paul
 Oertgen, Harry . . . St. Paul
 Ogden, Warner . . . St. Paul
 Ohage, Justus, Jr. . . . St. Paul
 Olson, C. A. . . . St. Paul
 O'Reilly, B. E. . . . St. Paul
 Ostergren, E. W. . . . St. Paul
 Ouelette, A. J. . . . St. Paul
 Page, C. V. . . . St. Paul
 Pearson, F. R. . . . St. Paul
 Pedersen, A. H. . . . St. Paul
 Perry, C. G. . . . St. Paul
 Peterson, D. B. . . . St. Paul
 Peterson, J. L. E. . . . St. Paul
 Peterson, V. N. . . . St. Paul
 Plondke, F. J. . . . St. Paul
 Prendergast, H. J. . . . St. Paul
 Prins, L. R., Jr. . . . St. Paul
 Radabaugh, R. C. . . . Hastings
 Ramsey, W. R. . . . St. Paul
 Richards, E. T. F. . . . St. Paul
 Richardson, H. E. . . . St. Paul
 Ritchie, H. P. . . . St. Paul
 Rogers, J. T. . . . St. Paul
 Rogers, S. F. . . . St. Paul
 Rosenholtz, Burton . . . St. Paul
 Rosenthal, Robert . . . St. Paul
 Rothrock, J. L. . . . St. Paul
 Rothschild, H. J. . . . St. Paul
 Ritt, A. E. . . . St. Paul
 Roy, Philemon . . . St. Paul
 Ruhberg, G. N. . . . St. Paul
 Rutherford, W. C. . . . St. Paul
 Ryan, J. J. . . . St. Paul
 Ryan, J. M. . . . St. Paul
 Ryan, M. E. . . . St. Paul
 Sarnecki, M. M. . . . St. Paul
 Satterlund, V. L. . . . St. Paul
 Savage, F. J. . . . St. Paul
 Schoch, R. B. J. . . . St. Paul
 Schons, Edward . . . St. Paul
 Scholdt, F. C. . . . St. Paul
 Schulze, A. G. . . . St. Paul
 Schwyzer, Arnold . . . St. Paul
 Scott, E. E. . . . St. Paul

Senkler, G. E. . . . St. Paul
 Setzer, H. J. . . . St. Paul
 Shellman, J. L. . . . St. Paul
 Shillington, M. A. . . . St. Paul
 Shimonek, S. W. . . . St. Paul
 Short, Jacob . . . St. Paul
 Singer, B. J. . . . St. Paul
 Skinner, H. O. . . . St. Paul
 Smisek, E. A. . . . St. Paul
 Snyder, G. W. . . . St. Paul
 Sohlberg, O. I. . . . St. Paul
 Souster, B. B. . . . St. Paul
 Sprafka, J. M. . . . St. Paul
 Steinberg, C. L. . . . St. Paul
 Sterner, E. C. . . . St. Paul
 Stevens, F. A. . . . Lake Elmo
 Stewart, Alexander . . . St. Paul
 Stinnette, S. E. . . . St. Paul
 Stoeckmann, A. E. . . . St. Paul
 Stolpestad, A. H. . . . St. Paul
 Strate, G. E. . . . St. Paul
 Swanson, E. O. . . . St. Paul
 Swanson, J. A. . . . St. Paul
 Swendsen, J. J. . . . St. Paul
 Teisberg, C. B. . . . St. Paul
 Thompson, F. A. . . . St. Paul
 Thoreson, M. O. . . . St. Paul
 Tift, C. R. . . . St. Paul
 Tregilgas, H. R. . . . South St. Paul
 Van Slyke, C. A. . . . St. Paul
 Veirs, Dean . . . St. Paul
 Veirs, Ruby S. . . . St. Paul
 Venables, A. E. . . . St. Paul
 Vonder Weyer, William . . . St. Paul
 Waas, C. W. . . . St. Paul
 Walker, A. E. . . . St. Paul
 Walter, C. W. . . . St. Paul
 Warnock, R. W. . . . St. Paul
 Warren, E. L. . . . St. Paul
 Watz, C. E. . . . St. Paul
 Welch, M. C. . . . St. Paul
 Werner, O. S. . . . Cambridge
 Wheeler, M. W. . . . St. Paul
 Whitacre, J. C. . . . St. Paul
 Whitmore, Frank . . . St. Paul
 Williams, C. K. . . . St. Paul
 Williamson, G. A. . . . St. Paul
 Wilson, J. A. . . . St. Paul
 Wilson, J. V. . . . St. Paul
 Winnick, J. B. . . . St. Paul
 Wolf, K. C. . . . St. Paul
 Wolfe, H. H. . . . St. Paul
 Wolff, H. J. . . . St. Paul
 Youngren, E. R. . . . St. Paul
 Zachman, L. L. . . . St. Paul
 Zander, C. H. . . . St. Paul
 Zimmermann, H. B. . . . St. Paul

RED RIVER VALLEY MEDICAL SOCIETY

Kittson, Mahnomen, Marshall, Norman, Pennington, Polk, Red Lake and Roseau Counties
 Regular meetings, second Tuesday, April, October and December
 Annual meeting, second Tuesday, December
 Number of Members: 53

President

Reff, A. R. . . . Crookston

Secretary

Froats, C. W. . . . Thief River Falls

Adkins, C. M. . . . Thief River Falls
 Adkins, G. H. . . . Grygla
 Anderson, W. S. . . . Minneapolis
 Berge, D. O. . . . Roseau
 Bertelson, O. L. . . . Crookston
 Biedermann, Jacob . . . Thief River Falls
 Blegen, H. M. . . . Warren
 Bohl, G. W. . . . Ada
 Borreson, Baldwin . . . Thief River Falls
 Bratrude, O. E. . . . Thief River Falls
 Brown, L. L. . . . Crookston
 Button, A. J. . . . Pine River
 Culver, L. G. . . . Thief River Falls

Delmore, J. L. . . . Roseau
 Erickson, Eskil . . . Halstad
 Froats, C. W. . . . Thief River Falls
 Griffin, P. J. . . . Fertile
 Haugseth, Enoch . . . Twin Valley
 Henney, W. H. . . . McIntosh
 Hodgson, H. H. . . . Crookston
 Holmstrom, C. H. . . . Warren
 Holte, Halvor . . . Crookston
 Kirk, G. P. . . . East Grand Forks
 Knutson, G. A. . . . Greenbush
 Leitch, N. M. . . . Warroad
 Locken, O. E. . . . Crookston
 Lynde, O. G. . . . Thief River Falls
 Melby, O. F. . . . Thief River Falls
 Mercil, W. F. . . . Crookston
 Morley, G. A. . . . Crookston
 Norman, J. F. . . . Crookston
 Ohnstad, J. L. . . . McIntosh
 Oppegaard, C. L. . . . Crookston

Oppegaard, M. O. . . . Crookston
 Paradis, W. G. . . . Crookston
 Parsons, J. G. . . . Crookston
 Potek, David . . . Minneapolis
 Reff, A. R. . . . Crookston
 Roy, J. A. . . . Red Lake Falls
 Shaleen, A. W. . . . Hallock
 Shedlov, Abraham . . . Fosston
 Sherman, R. V. . . . Thief River Falls
 Smith, A. M. . . . Thief River Falls
 Sorenson, E. M. . . . Thief River Falls
 Stocking, F. F. . . . Hallock
 Stuurmanns, S. H. . . . Erskine
 Swendenburg, A. W. . . . Thief River Falls
 Swendenburg, P. A. . . . Pawnee, Nebraska
 Tanglin, W. G. L. . . . Mahnomen
 Torgerson, W. B. . . . Oklee
 Watson, N. M. . . . Red Lake Falls
 Weed, V. A. . . . Red Lake Falls
 Wiltrout, I. G. . . . Oslo

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

Annual meeting, May
 Number of Members: 26

President

Goblirsch, A. P. . . . Sleepy Eye

Secretary

Fritsche, C. J. . . . New Ulm

Brey, F. W. . . . Wabasso
 Dubbe, F. H. . . . New Ulm
 Dysterheft, A. F. . . . Gaylord
 Fritsche, Albert . . . New Ulm
 Fritsche, C. J. . . . New Ulm

Fritsche, T. R. . . . New Ulm
 Gibbons, F. C. . . . Comfrey
 Goblirsch, A. P. . . . Sleepy Eye
 Hammermeister, T. F. . . . New Ulm
 Howde, Rolf . . . Winthrop
 Jamieson, Earl . . . Walnut Grove
 Just, H. J. . . . Lafayette
 Kolset, C. D. . . . Sanborn
 Kusske, A. L. . . . New Ulm
 Nuessle, W. G. . . . Springfield
 Olson, K. L. . . . Gibbon

Peterson, R. A. . . . Vesta
 Reineke, G. F. . . . New Ulm
 Rothenburg, J. C. . . . Springfield
 Saffert, C. A. . . . New Ulm
 Seifert, O. J. . . . New Ulm
 Shrader, J. S. . . . Jordan
 Vogel, H. A. L. . . . New Ulm
 Vogel, J. H. . . . New Ulm
 Weiser, G. B. . . . New Ulm
 Wohlrahe, E. J. . . . Springfield

ROSTER MINNESOTA STATE MEDICAL ASSOCIATION

RENVILLE COUNTY MEDICAL SOCIETY

Regular meeting, first Tuesday of each month

Annual meeting, first Tuesday of November

Number of Members: 20

President
Passer, A. A. Olivia

Secretary
Dordal, J. Sacred Heart

Adams, R. C. Bird Island
Billings, R. E. Franklin
Brand, W. A. Redwood Falls

Cole, H. B. Redwood Falls
Cole, J. G. Redwood Falls
Cosgriff, J. A. Bird Island
Dordal, J. Sacred Heart
Fawcett, A. M. Renville
Dummer, W. M. Fairfax
Flinn, T. E. Redwood Falls
Games, E. C. Buffalo Lake
Johnson, O. H. Redwood Falls

Johnson, W. E. Morgan
Lenz, J. R. Morton
Loenholdt, E. H. Hector
Madland, R. S. Fairfax
Mesker, G. H. Olivia
Passer, A. A. Olivia
Penhall, F. W. Morton
Solsem, F. N. Sacred Heart

RICE COUNTY MEDICAL SOCIETY

Regular meeting, seven or eight annually

Annual meeting, December

Number of Members: 40

President
Murdoch, J. M. Faribault

Secretary
Plonske, C. J. Faribault

Babcock, F. M. Northfield
Beede, E. R. Faribault
Davis, F. U. Faribault
Dugan, L. F. Faribault
Dungay, N. S. Northfield
Engstrom, F. A. Waukegan
Francis, D. W. Faribault
Haessly, S. B. Faribault
Hamilton, Angie G. S. Philadelphia, Pa.
Hanson, A. M. Faribault

Haynes, A. L. Faribault
Huxley, F. R. Faribault
Kanne, C. W. Faribault
Kucera, S. T. Lonsdale
Lende, Norman Faribault
Lexa, F. J. Lonsdale
Lufkin, C. D. Northfield
Mayland, M. L. Faribault
McKeon, J. O. Montgomery
Meyer, F. C. Kenyon
Meyer, P. F. Faribault
Moses, Joseph, Jr. Northfield
Moses, R. R. Kenyon
Murdoch, J. M. Faribault
Nuetzman, A. W. Faribault

Plonske, C. J. Faribault
Robilliard, C. M. Faribault
Rohrer, C. A. Waterville
Rudie, C. N. Kenyon
Rumpf, C. W. Faribault
Rumpf, W. H. Faribault
Seeley, I. F. Northfield
Stewart, Gwendolyn Faribault
Thorson, O. P. Northfield
Traeger, C. A. Faribault
Warren, F. S. Washington, D. C.
Wilkowske, R. J. Nerstrand
Wilson, Warren Northfield
Wilson, W. E. Northfield
Wylie, A. R. T. Faribault

ST. LOUIS COUNTY MEDICAL SOCIETY

Carlton, Cook, Itasca, Lake and St. Louis Counties

Regular meeting, second Thursday every month

Annual meeting, December

Number of Members: 177

President
Klein, Harry Duluth

Secretary
Gillespie, M. G. Duluth

Adams, B. S. Hibbing
Addy, E. R. Gilbert
Alkins, W. M. Eveleth
Armstrong, E. L. Duluth
Athens, A. G. Duluth
Ayres, G. T. Ely
Bagley, Elizabeth C. Duluth
Bagley, W. R. Duluth
Bardon, Richard Duluth
Barney, L. A. Duluth
Berdez, G. L. Duluth
Bianco, A. J. Duluth
Binet, H. E. Grand Rapids
Blacklock, S. S. Hibbing
Blakely, C. C. Barnum
Boman, P. G. Duluth
Bowen, R. L. Hibbing
Boyer, S. H., Jr. Duluth
Boyer, S. H., Sr. Duluth
Braverman, N. J. Duluth
Bray, C. W. Biwabik
Bray, P. N. Duluth
Burns, R. L. Two Harbors
Cantwell, W. F. International Falls
Carstens, C. F. Hibbing
Chapman, T. L. Duluth
Cheney, E. L. Duluth
Christensen, E. P. Two Harbors
Clement, T. G. Duluth
Clark, F. F. Duluth
Collins, A. N. Duluth
Collins, H. C. Duluth
Convery, W. A. Duluth
Davis, B. F. Duluth
Doolittle, L. E. Duluth
Doyle, G. C. Duluth
Drenning, F. C. Duluth
Eckman, P. F. Duluth
Eckman, R. J. Duluth
Ekblad, J. W. Duluth
Elias, F. J. Duluth
Emanuel, K. W. Duluth
Eppard, R. M. Cloquet
Estrem, T. A. Hibbing
Ewens, H. B. Virginia
Fankboner, A. V. Mountain Iron
Fawcett, K. R. Duluth
Fellows, M. F. Duluth
Feuling, J. C. Bovey
Fiala, M. J. Duluth
Fischer, M. McC. Duluth
Folker, L. W. Proctor
Forbes, R. S. Duluth
Garrow, D. M. Rochester
Gillespie, M. G. Duluth

Gillespie, N. H. Duluth
Goldish, D. R. Duluth
Goodman, C. E. Virginia
Gowan, L. R. Duluth
Graham, Robert Duluth
Graves, W. N. Duluth
Hall, A. E. Virginia
Haney, C. L. Duluth
Harris, C. N. Nashwauk
Hatch, W. E. Duluth
Hathaway, S. J. Proctor
Hayes, M. F. Nashwauk
Hedberg, G. A. Nopemung
Heiam, W. C. Cook
Heimark, O. E. Duluth
Hilding, A. C. Duluth
Hill, F. E. Duluth
Hirschboeck, F. J. Duluth
Hirschfeld, M. S. Duluth
Hoff, H. O. Duluth
Jacobson, Clarence Chisholm
Jensen, T. J. Duluth
Jolin, F. M. Grand Rapids
Jolin, R. V. Grand Rapids
Karleen, P. E. Spring Valley
Keyes, C. R. Duluth
Klein, Harry Duluth
Knapp, F. N. Duluth
Kohlbray, C. O. Duluth
Kotchevar, F. R. Eveleth
Kraft, Peter Hibbing
Krantz, C. I. Duluth
Kuth, J. R. Duluth
Laird, A. T. Nopemung
Lenont, C. B. Virginia
Lepak, F. J. Duluth
Litman, S. N. Duluth
Loofbourrow, E. H. Keewatin
Lundquist, C. W. Coleraine
MacRae, G. C. Duluth
Magney, F. H. Duluth
Malmstrom, J. A. Virginia
Manley, J. R. Duluth
Martin, E. T. Duluth
Martin, W. C. Duluth
Mayne, R. M. Duluth
McCarty, P. D. Ely
McComb, C. F. Duluth
McCooy, Mary K. Duluth
McDaniel, S. P. Mountain Iron
McDonald, A. L. Duluth
McHaffie, O. L. Duluth
McLeod, J. L. Grand Rapids
McNutt, J. R. Duluth
Mead, C. H. Duluth
Merriman, L. L. Duluth
Moe, R. J. Duluth
Moe, Thomas Moose Lake
Monroe, P. B. Two Harbors
More, C. W. Eveleth
Morsman, L. W. Hibbing

Morss, C. R. Zumbrota
Mueller, Selma C. Duluth
Nelson, E. H. Chisholm
Nelson, R. L. Duluth
Nicholson, M. A. Duluth
Nutting, R. E. Duluth
Olson, A. E. Duluth
Parker, O. W. Ely
Pennie, D. F. Duluth
Peterson, E. N. Eveleth
Peterson, J. H. Duluth
Power, J. E. Duluth
Raadquist, C. S. Hibbing
Raider, F. W. S. Cloquet
Raider, R. F. Cloquet
Robinson, J. M. Duluth
Rood, D. C. Hibbing
Rowe, O. W. Duluth
Rudie, P. S. Duluth
Ryan, W. J. Duluth
Sach-Rowitz, Alvin Moose Lake
Salter, R. A. Virginia
Sarf, O. E. Buhl
Scherer, C. A. Duluth
Schroder, C. H. Duluth
Seashore, R. T. Duluth
Shapiro, E. Z. Duluth
Shastid, T. H. Duluth
Shaw, A. W. Buhl
Sinamark, Andrew Hibbing
Sisler, C. E. Grand Rapids
Slyfield, F. F. Duluth
Smith, C. M. Duluth
Smith, W. R. Grand Marais
Spicer, F. W. Duluth
Spurbeck, R. G. Cloquet
Steffens, L. F. Hibbing
Strathern, M. L. Gilbert
Strobel, W. G. Duluth
Stuart, A. B. Cloquet
Sukeforth, L. A. Duluth
Sutherland, H. N. Ely
Swanson, P. E. Virginia
Swenson, A. O. Duluth
Taylor, C. W. Duluth
Tibbets, M. H. Duluth
Tilderquist, D. L. Duluth
Tuohy, E. L. Duluth
Urberg, S. E. Duluth
Vercellini, C. E. Duluth
Walker, A. E. Duluth
Wallace, M. O. Duluth
Webber, E. E. Duluth
West, E. J. Duluth
Wheeler, D. W. Duluth
Wilkinson, Stella L. Duluth
Wingquist, C. G. Carlton
Winter, J. A. Duluth
Young, T. O. Duluth
Young, V. A. Duluth
Zlatovski, Michael Duluth

ROSTER MINNESOTA STATE MEDICAL ASSOCIATION

SCOTT-CARVER COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday of the month

Annual meeting, second Tuesday, June

Number of Members: 27

Phillips, W. H.	President	Jordan
Crow, E. R.	Secretary	Arlington
Buck, F. H.		Shakopee
Cervenka, C. F.		New Prague
Crow, E. R.		Arlington
Eklund, E. J.		Norwood
Emmerson, W. S.		Mayer

Fischer, H. P.	Shakopee
Havel, H. W.	Shakopee
Hebeisen, M. B.	Chaska
Henriksen, H. G.	Elko
Juergens, H. M.	Belle Plaine
Lighbourn, E. T.	Jordan
Maert, W. F.	New Prague
Martin, T. P.	Arlington
Nagel, H. D.	Waconia
Novak, E. E.	New Prague
Olson, C. J.	Belle Plaine

Ormond, D. T.	Waconia
Pearson, B. F.	Shakopee
Phillips, W. H.	Jordan
Pogue, R. E.	Watertown
Reiter, H. W.	Shakopee
Schmelpfenig, G. T.	Chaska
Simons, B. H.	Chaska
Westerman, A. E.	Montgomery
Westerman, F. C.	Montgomery
Woodworth, L. F.	Le Center
Wunder, H. E.	Shakopee

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

Cottonwood, Jackson, Murray, Nobles, Pipestone, and Rock Counties

Regular meetings, Spring and Fall

Annual meetings, usually November

Number of Members: 57

Stanley, C. R.	President	Worthington
DeBoer, Hermanus	Secretary	Edgerton
Arnold, E. W.		Adrian
Basinger, H. P.		Windom
Basinger, H. R.		Mountain Lake
Benjamin, W. G.		Pipestone
Bofenkamp, F. W.		Luverne
Bong, J. H.		Jasper
Brown, A. H.		Pipestone
Carlson, J. V.		Westbrook
Chadbourn, A. G.		Heron Lake
Chunn, S. S.		Pipestone
Clark, H. H.		Edgerton
Cress, P. J.		Ellsworth
DeBoer, Hermanus		Edgerton
Ditmeier, Louise M. G.		Jasper
Dolan, C. P.		Worthington

Doms, H. C.	Slayton
Dudley, J. H.	Windom
Engli, Sigfred	Jackson
Halloran, W. H.	Jackson
Halpern, D. J.	Brewster
Harrison, P. W.	Worthington
Johnson, R. E.	Worthington
Kendahl, A. M.	Jasper
Kilbride, E. A.	Worthington
Larson, J. T.	Lake Wilson
Lindahl, M. J.	Jasper
Lowe, Thomas	Pipestone
Maitland, D. P.	Jackson
Maitland, E. T.	Jackson
Manson, F. M.	Worthington
McCreia, J. M.	Fulda
McKeown, E. G.	Pipestone
Mork, B. O., Jr.	Worthington
Mork, B. O.	Worthington
Pankratz, P. J.	Mountain Lake
Patterson, W. E.	Westbrook

Pertl, A. L.	Windom
Piper, W. A.	Mountain Lake
Portmann, W. C.	Jackson
Priest, R. E.	Worthington
Richmond, C. D.	Jeffers
Rose, J. T.	Lakefield
Ross, W. P.	Worthington
Schutz, E. S.	Mountain Lake
Sherman, C. L.	Luverne
Slater, S. A.	Worthington
Sogge, L. L.	Windom
Stanley, C. R.	Worthington
Stevenson, B. M.	Fulda
Stratte, H. C.	Windom
Tofte, Josephine	Dawson
Thorson, E. O.	Luverne
Waller, J. D.	Wilmont
Williams, A. B.	St. Paul
Williams, C. A.	Pipestone
Williams, L. A.	Slayton
Wright, C. O.	Luverne

STEARNS-BENTON COUNTY MEDICAL SOCIETY

Regular meetings, third Thursday of the month

Annual meeting, third Thursday of December

Number of Members: 35

Kohler, D. W.	President	St. Joseph
Libert, J. N.	Secretary	St. Cloud
Beuning, J. B.		Albany
Clark, H. B.		St. Cloud
DuBois, J. A.		Sauk Center
DuBois, J. F.		Sauk Center
Engstrom, G. F.		Belgrade
Freeman, W. L.		St. Cloud
Friesleben, William		Sauk Rapids
Gaida, J. B.		St. Cloud

Gelz, J. J.	St. Cloud
Goehrs, H. W.	St. Cloud
Haberman, Emil	Osakis
Hemstead, Werner	St. Cloud
Kettlewell, R. B.	Sauk Center
Kuhlmann, August	Melrose
Johnson, Walfred	Sauk Center
Jones, R. N.	St. Cloud
Kohler, D. W.	St. Joseph
Koop, S. H.	Richmond
Lewis, C. B.	St. Cloud
Libert, J. N.	St. Cloud
Mahowald, A.	Albany
McDowell, J. P.	St. Cloud

Meyer, A. A.	Melrose
Moynihan, A. F.	Sauk Center
Rathbun, C. A.	St. Cloud
Richards, W. B.	St. Cloud
Ridgway, Alexander	South Haven
Rydburg, W. C.	Brooten
Schatz, F. J.	St. Cloud
Sherwood, G. E.	Kimball
Stangl, Fred	St. Cloud
Stangl, P. E.	St. Cloud
Sutton, C. S.	St. Cloud
Wenner, W. T.	St. Cloud
Zachman, A. H.	Melrose

STEELE COUNTY MEDICAL SOCIETY

Regular meetings, Monthly

Annual meeting, December

Number of Members: 17

Berghs, L. V.	President	Owatonna
Schaefer, J. F.	Secretary	Owatonna
Berghs, L. V.		Owatonna
Carlson, V. W.		Bloomington

Dewey, D. H.	Owatonna
Ertel, E. Q.	Ellendale
Farabough, C. L.	Owatonna
Flores, O. T.	Dodge Center
Kreuzer, T. C.	Owatonna
McEnaney, C. T.	Owatonna
McIntyre, J. A.	Owatonna
Melby, Benedik	Bloomington

Morehead, D. E.	Owatonna
Nelson, E. J.	Owatonna
Roberts, O. W.	Owatonna
Schaefer, J. F.	Owatonna
Senn, E. W.	Owatonna
Smerish, J. F.	Owatonna
Stewart, A. B.	Owatonna

UPPER MISSISSIPPI MEDICAL SOCIETY

Aitkin, Beltrami, Cass, Clearwater, Crow Wing, Hubbard, Koochiching, Lake of the Woods, Morrison, Todd and Wadena Counties

Regular meetings, Spring, Summer, Fall

Annual meeting, January

Number of Members: 84

Watson, A. M.	President	Royalton
Badeaux, G. I.	Secretary	Brainerd
Anderson, C. E.		Brainerd
Badeaux, G. I.		Brainerd
Beise, R. A.		Brainerd
Borgerson, A. H.		Sebeka
Bosland, H. G.		Vernadale
Bowers, J. T.		Bemidji
Brink, A. A.		Baudette

Burns, H. A.	Ah-Gwah-Ching
Campbell, R. W.	Cass Lake
Cardle, G. E.	Ah-Gwah-Ching
Carlson, C. E.	Aitkin
Christie, G. R.	Long Prairie
Christie, R. L.	Long Prairie
Cook, J. M.	Staples
Corrigan, J. E.	Spooner
Davis, L. T.	Wadena
Davis, T. C.	Wadena
Fait, R. V.	Little Falls
Feldman, F. M.	Minneapolis
Frost, H. T.	Wadena

Garlock, A. V.	Bemidji
Garlock, D. H.	Bemidji
Gerber, M. P.	Brainerd
Ghostley, Mary C.	Puposky
Gifford, B. L.	Long Prairie
Grawn, F. A.	Norhome
Grogan, J. S.	Wadena
Groschupf, T. P.	Bemidji
Grose, F. N.	Clarissa
Hanover, R. D.	Littlefork
Hanson, E. C.	Park Rapids
Hawkinson, J. P.	Crosby
Hawkinson, L. F.	Brainerd

ROSTER MINNESOTA STATE MEDICAL ASSOCIATION

Healy, R. T.....Pierz
Hendrickson, R. R.....Wadena
Higgs, W. W.....Park Rapids
Holst, C. F.....Little Falls
Holst, J. B.....Little Falls
Holt, G. W.....Lake City
House, Z. E.....Cass Lake
Hubbard, O. E.....Brainerd
Hubin, E. G.....Deerwood
Jacobson, D. J.....Blackduck
Johnson, C. E.....Pine River
Johnson, E. W.....Bemidji
Johnson, V. E.....Walker
Kelly, B. W.....Aitkin
Kerlan, Irvin.....McGregor
Kerlan, S. Z.....Aitkin
Lamb, H. L.....Little Falls

Laney, R. L.....Fertile
Larson, L. J.....Bagley
Larson, L. M.....Oak Terrace
Laughlin, J. T.....Grey Eagle
Marcum, E. H.....Bemidji
Mark, Hilbert.....Ah-Gwah-Ching
Mason, J. A.....International Falls
McCann, D. F.....Bemidji
Mosby, M. E.....Long Prairie
Moyer, R. E.....Fort Snelling
Nelson, Nesmith.....Brainerd
Osburn, B. F.....International Falls
Petraborg, H. T.....Aitkin
Pierce, C. H.....Wadena
Quanstrom, V. E.....Brainerd
Reichelderfer, C. F.....Staples
Ringle, O. F.....Walker

Roberts, L. M.....Little Falls
Rosenfield, A. B.....Pequot
Shannon, S. S.....Crosby
Simons, E. J.....Ah-Gwah-Ching
Simons, J. B.....Swanville
Smith, B. A.....Crosby
Spurzem, Clementine.....Ah-Gwah-Ching
Stein, R. J.....Pierz
Stevens, John.....Gonvick
Thabes, J. A., Jr.....Brainerd
Thabes, J. A., Sr.....Brainerd
Watson, A. M.....Royalton
Watson, P. T.....Cass Lake
Watson, W. J.....Holdingford
Will, W. W.....Bertha
Wilson, V. A.....Ah-Gwah-Ching
Withrow, M. E.....International Falls

WABASHA COUNTY MEDICAL SOCIETY Annual meeting, first Thursday after first Monday in July Number of Members: 11

President
Ochsner, C. G.....Wabasha
Secretary
Wilson, W. F.....Lake City

Bayley, E. C.....Lake City
Bouquet, B. J.....Wabasha
Cochrane, W. J.....Lake City
Collins, J. S.....Wabasha
Fleischauer, D. S.....Wabasha
Flesche, B. A.....Lake City

Frost, R. H.....Wabasha
Ochsner, C. G.....Wabasha
Sherman, H. T.....Plainview
Slocumb, J. A.....Plainview
Wilson, W. F.....Lake City

WASECA COUNTY MEDICAL SOCIETY Regular meetings, at call of President Annual meeting, December Number of Members: 9

President
Oeljen, S. C. G.....Waseca
Secretary
Hottinger, R. C.....Janesville

Bernstein, W. C.....New Richland
Chadbourn, C. R.....Janesville
Gallagher, B. J.....Waseca
Hottinger, R. C.....Janesville
Lynn, J. F.....Waseca

McIntire, H. M.....Waseca
Oeljen, S. C. G.....Waseca
Olds, G. H.....Waseca
Swenson, O. J.....Waseca

WASHINGTON COUNTY MEDICAL SOCIETY Regular meetings, second Tuesday in January, February, March, April, May, September, October, November and December Annual meeting second Tuesday in December Number of Members: 16

President
Brooks, G. F.....Stillwater
Secretary
Boleyn, E. S.....Stillwater
Boleyn, E. S.....Stillwater
Brekke, H. J.....Minneapolis

Brooks, G. F.....Stillwater
Buckley, C. H.....Stillwater
Ewald, R. P.....Newport
Haines, J. H.....Stillwater
Humphrey, W. R.....Stillwater
Josewski, R. J.....Stillwater
Kalinoff, D. J.....Stillwater

Linner, Gunnar.....Stillwater
Mingo, F. E.....Hugo
Poirier, J. A.....Forest Lake
Ruggles, G. McC.....Forest Lake
Strand, E. V.....Bayport
Stuhr, J. W.....Stillwater
Van Meier, Henry.....Stillwater

WATONWAN COUNTY MEDICAL SOCIETY Regular meeting, at call Annual meeting, December Number of Members: 7

President
Bergman, O. B.....St. James
Secretary
Grimes, H. B.....Madelia

Bergman, O. B.....St. James
Bratrude, E. J.....St. James
Bregel, F. L.....St. James
Grimes, H. B.....Madelia

Hagen, O. E.....Butterfield
McCarthy, W. J.....Madelia
Thompson, Albert.....St. James

WEST CENTRAL MINNESOTA MEDICAL SOCIETY Big Stone, Pope, Stevens and Traverse Counties Regular meetings, January, April and June Annual meeting, October Number of Members: 24

President
Cumming, J. F.....Morris
Secretary
Nelson, M. C.....Lowry
Arneson, A. I.....Morris
Bates, B. V.....Browns Valley
Bergan, Otto.....Clinton
Bolsta, Charles.....Ortonville

Caine, C. E.....Morris
Cumming, J. F.....Morris
Doleman, N. F.....Tintah
Eberlin, E. A.....Glenwood
Elsey, E. M.....Glenwood
Elsey, J. R.....Glenwood
Ewing, C. F.....Wheaton
Fitzgerald, E. T.....Morris
Giesen, A. F.....Starbuck
Karn, B. R.....Ortonville

Leland, J. T.....Herman
Lindberg, A. L.....Wheaton
Linde, Herman.....Cyrus
McIver, B. A.....Lowry
McKenna, M. J.....Graceville
Nelson, M. C.....Lowry
Oliver, C. I.....Graceville
Oliver, I. L.....Graceville
Ransom, M. L.....Hancock
Shelver, H. J.....Ortonville

WINONA COUNTY MEDICAL SOCIETY Regular meetings, first Monday Quarterly Annual meeting, first Monday in January Number of Members: 25

President
Younger, L. I.....Winona
Secretary
Steiner, I. W.....Winona
Benoit, F. T.....Winona
Christensen, E. E.....Winona
Clay, F. H.....St. Charles
Heise, W. F. C.....Winona
Keyes, J. D.....Winona

Lichtenstein, H.....Winona
Lindsay, W. V.....Winona
Mattison, P. A.....Winona
McLaughlin, E. M.....Winona
Meinert, A. E.....Winona
Nauth, W. W.....Winona
Neumann, C. A.....Winona
Page, R. L.....St. Charles
Risser, E. D.....Winona
Robbins, C. P.....Winona

Roth, F. D.....Lewiston
Satterlee, H. W.....Lewiston
Schaefer, S.....Winona
Steiner, I. W.....Winona
Tweedy, G. J.....Winona
Tweedy, R. B.....Winona
Walker, G. H.....Winona
Wilson, R. H.....Winona
Younger, L. I.....Winona
Zintek, A. R.....Winona

ROSTER MINNESOTA STATE MEDICAL ASSOCIATION

WRIGHT COUNTY MEDICAL SOCIETY

Regular meeting, Quarterly

Annual meeting, first Tuesday after first Monday in October

Number of Members: 19

President
 *Johnson, V. P.....Delano
 Secretary
 Catlin, J. J.....Buffalo
 Anderson, W. P.....Buffalo

Bendix, L. H.....Annandale
 Catlin, J. J.....Buffalo
 Catlin, T. J.....Buffalo
 Ellison, F. E.....Monticello
 Grundset, O. J.....Montrose
 Harriman, L. Howard Lake
 Hart, W. E.....Monticello
 Hoyer, L. J.....Howard Lake
 *Johnson, V. P.....Delano

Lee, J. L.....Watertown
 Olson, J. W.....Cokato
 Peterson, O. L.....Cokato
 Phillips, A. E.....Delano
 Ridgway, A. M.....Annandale
 Roholt, C. L.....Waverly
 Rousseau, Victor Maple Lake
 Swezey, B. F.....Buffalo
 Thompson, Arthur Cokato

*Deceased.

*Deceased

ROSTER MINNESOTA STATE MEDICAL ASSOCIATION

Calhoun, F. W. Albert Lea
Callahan, F. F. Pokegama
Callerstrom, G. W. Minneapolis
Calvin, A. R. St. Paul
Cameron, Isabell Minneapolis
Camp, J. D. Rochester
Camp, W. E. Minneapolis
Campbell, J. E. So. St. Paul
Campbell, L. M. Minneapolis
Campbell, O. J. Minneapolis
Campbell, R. W. Cass Lake
Canfield, W. W. Houston
Cantwell, W. F. International Falls
Cardle, A. E. Minneapolis
Cardle, G. E. Ah-Gwah-Ching
Carey, J. B. Minneapolis
Carlaw, C. M. Minneapolis
Carlson, C. E. Aitkin
Carlson, H. A. Minneapolis
Carlson, J. B. Westbrook
Carlson, Lawrence Minneapolis
Carlson, L. A. Rochester
Carlson, V. W. Blooming Prairie
Carman, J. E. Detroit Lakes
Carmichael, F. A., Jr. Rochester
Caron, R. P. Minneapolis
Carroll, W. C. St. Paul
Carstens, C. F. Hibbing
Catlin, J. J. Buffalo
Catlin, T. J. Buffalo
Cavanor, F. T. Minneapolis
Cervenka, C. F. New Prague
Chadbourne, A. G. Heron Lake
Chadbourne, C. R. Janesville
Chambers, W. C. Blue Earth
Chapman, T. L. Duluth
Chatterton, C. C. St. Paul
Cheney, E. L. Duluth
Cherry, C. H. Minneapolis
Chesley, A. J. Minneapolis
Christensen, E. E. Winona
Christensen, E. P. Two Harbors
Christenson, C. R. Minneapolis
Christiansen, A. St. Paul
Christianson, H. W. Minneapolis
Christie, G. R. Long Prairie
Christie, R. L. Long Prairie
Christison, J. T. St. Paul
Chunn, S. S. Pipestone
Clagett, O. T. Rochester
Clark, F. F. Duluth
Clark, H. B. St. Cloud
Clark, H. H. Edgerton
Clark, H. S. Minneapolis
Clark, L. W. Spring Valley
Clark, T. C. Minneapolis
Clark, R. L., Jr. Rochester
Clay, F. H. St. Charles
Claydon, D. R. Red Wing
Claydon, H. F. Zumbrota
Claydon, L. E. Red Wing
Clement, J. B. Lester Prairie
Clement, T. G. Duluth
Clifford, G. W. Osakis
Clifton, T. A. Chatfield
Cochrane, W. J. Lake City
Coffey, R. J. Rochester
Cohen, S. S. Oak Terrace
Colby, Woodard St. Paul
Cole, H. B. Redwood Falls
Cole, J. G. Redwood Falls
Cole, W. H. St. Paul
Collic, H. G. St. Paul
Collins, A. N. Duluth
Collins, H. C. Minneapolis
Collins, J. S. Wabasha
Combacker, L. C. Fergus Falls
Comfort, M. W. Rochester
Condit, W. H. Minneapolis
Conner, H. M. Rochester
Connor, C. E. St. Paul
Cook, C. K. St. Paul
Cook, E. N. Rochester
Cook, H. W. Minneapolis
Cook, J. M. Staples
Cooney, H. C. Princeton
Cooper, M. D. Winnebago
Cooperman, H. O. Minneapolis
Corbett, J. F. Minneapolis
Corniea, A. D. Minneapolis
Corrigan, J. E. Spooner
Cosman, E. O. Minneapolis
Cosgriff, J. A. Bird Island
Cottam, G. G. Minneapolis
Counsellor, V. S. Rochester
Countryman, R. S. St. Paul
Covell, W. W. St. Peter
Covertry, W. A. Duluth
Cowern, E. W. North St. Paul
Cowing, P. G. Evansville
Crafts, L. M. Minneapolis

Cragg, R. W. Rochester
Craig, W. McK. Rochester
Cranmer, R. R. Minneapolis
Cranston, R. W. St. Louis Park
Creedy, C. D. Minneapolis
Creighton, R. H. Minneapolis
Cremer, P. H. Hastings
Crenshaw, J. L. Rochester
Cress, E. E. Boyd
Cress, P. J. Ellsworth
Crewe, J. E. Rochester
Critchfield, L. R. St. Paul
Cronwell, B. J. Austin
Crow, E. R. Arlington
Culligan, J. M. St. Paul
Culver, L. G. Thief River Falls
Cunningham, J. F. Morris
Curtin, J. F. Minneapolis
Curtis, R. A. Le Center
Cusick, P. L. Rochester
Cutts, George Minneapolis
Cutts, R. E. Minneapolis
Dack, L. G. St. Paul
Dady, E. E. Minneapolis
Dahl, E. O. Minneapolis
Dahl, G. A. Mankato
Dahl, J. A. Minneapolis
Daigault, Oscar Benson
Daniel, D. H. Minneapolis
Daniel, L. M. Minneapolis
Danielson, K. A. Litchfield
Danielson, Lennox Litchfield
Darling, J. B. St. Paul
Dart, L. O. Minneapolis
Daugherty, E. B. St. Paul
Daugherty, L. E. St. Paul
Davenport, L. H. Rochester
Davis, A. C. Rochester
Davis, B. F. Duluth
Davis, F. U. Faribault
Davis, Herbert St. Paul
Davis, I. G. Rushford
Davis, J. C. Minneapolis
Davis, L. T. Wadena
Davis, T. C. Wadena
Davis, William St. Paul
DeBoer, Hermanus Edgerton
Dedolph, Karl St. Paul
Delavan, P. A. St. Paul
Delmore, J. L. Roseau
Delo, C. W. Minneapolis
Demo, P. W. Wells
Denman, A. V. Mankato
Derauf, B. I. St. Paul
Desjardins, A. U. Rochester
Devereaux, T. J. Wayzata
Dewey, D. H. Owatonna
Dickson, T. H., Jr. St. Paul
Diehl, H. S. Minneapolis
Diessner, H. D. Minneapolis
Dietrich, F. S., Jr. Rochester
Ditmeier, Louise M. G. Jasper
Dittman, G. C. St. Paul
Dixon, C. F. Rochester
Dolan, C. P. Worthington
Doleman, N. F. Tintah
Dolder, F. C. Eyota
Doms, H. C. Slayton
Donaldson, C. A. Tucson, Ariz.
Donohue, P. F. St. Paul
Donovan, D. L. Albert Lea
Doolittle, L. E. Duluth
Dordal, J. Sacred Heart
Dorge, R. I. Minneapolis
Dornblaser, H. B. Minneapolis
Dorsey, G. C. Minneapolis
Dovre, C. M. St. Paul
Dowswell, W. J. Kerkhoven
Doxey, G. L. Minneapolis
Doyle, G. C. Duluth
Doyle, L. O. Minneapolis
Drake, C. B. St. Paul
Drake, C. R. Minneapolis
Drake, F. A. Lanesboro
Dredge, H. P. Sandstone
Drenning, F. C. Duluth
Drill, H. E. Hopkins
Drips, Della G. Rochester
Drought, W. W. Fergus Falls
Dry, T. J. Rochester
Dubbe, F. H. New Ulm
DuBois, J. A. Sauk Center
DuBois, J. F. Sauk Center
Dudley, J. H. Windom
Duff, E. R. Minneapolis
Dugan, L. F. Faribault
Dukelow, D. A. Minneapolis
Dumas, A. G. Minneapolis
Dummer, W. M. Fairfax
Duncan, J. W. Moorhead

Dungay, N. S. Northfield
Dunlap, E. H. Minneapolis
Dunn, G. R. Minneapolis
Dunn, J. N. St. Paul
Duryea, W. M. Minneapolis
Dutton, C. E. Minneapolis
Dvorak, B. A. Minneapolis
Dwan, P. F. Minneapolis
Dworsky, S. D. Minneapolis
Dysterheft, A. F. Gaylord
Earl, G. A. St. Paul
Earl, Robert St. Paul
Eaton, L. McK. Rochester
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Lippmann, E. W. Hutchinson

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ROCKY MOUNTAIN SPOTTED FEVER IN MINNESOTA*

Report of a Second Indigenous Case and Biologic Studies

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RECENT studies have shown that diseases immunologically identical with Rocky Mountain spotted fever occur in many places throughout the world. Within the past few years Boutonneuse Fever of the Mediterranean littoral, Sao Paulo "Typhus" of South America, Eastern Rocky Mountain spotted fever and another mild variety of the disease isolated in Minnesota⁹ have all been found to be immunologically related. It is desirable, therefore, in naming these infections to avoid the implication of geographic restriction by omitting certain limiting adjectives. The term "spotted fever" may be applied to this group of diseases for the sake of simplicity except for the possible confusion which may arise from the designation of typhus fever as "Fleckfieber" (spot-fever) in German and because meningococcus meningitis was once called "spotted fever." Since etiologic terms are preferable to descriptive clinical or anatomic ones in classifying infectious disease, the term "tick fever" or "rickettsial fever" qualified by the variety of rickettsia involved, may eventually prove to be most satisfactory.

The apparent increasing prevalence of spotted fever along the Atlantic seaboard, in Iowa,⁴ Missouri,³ Texas⁵ and other states does not by any means indicate a recent spread of the disease. The studies of Parker,^{6,7,8} and others, have shown that animals, especially rodents, which serve as reservoirs for the infection, and ticks which transmit the infection to man, occur throughout the United States and in parts of Canada. It has been shown, for example, that a

high percentage of ticks collected in Minnesota by Green contain what appears to be spotted fever virus of low-grade virulence.⁸ As in the case of other infectious diseases, spotted fever will probably be found in man in any region favorable to the existence of animal hosts and insect vectors. It is almost a certainty that infections of the spotted fever group have always existed endemically in certain localities and that from time to time man is infected. It appears then that the increase in the recorded number of recognized cases is chiefly due to increasing knowledge of the disease and to recently developed methods of diagnosis. Doubtless many more cases exist than are recognized. Many patients fail to seek medical aid and many mild cases may be wrongly diagnosed or overlooked.

It is highly improbable that the only two cases of spotted fever indigenous to Minnesota should have fallen into the hands of the author. However, aside from a doubtful case mentioned by Fricks in 1914,¹ and of a possible case of typhus fever reported by Head,² in 1915, which in the light of subsequent knowledge may have been spotted fever, no other reports have been found. It is for the purpose of emphasizing the possibility that many unrecognized cases occur in Minnesota that the present discussion and following case report are published.

Case Report

The patient, R. D., a university student, aged twenty-one, was admitted to the hospital on July 5, 1935, complaining of general malaise, anorexia, a "cold" and a rash on the arms, legs, hands and feet. There was

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no history of a tickbite, but the patient had visited his home in Blue Earth county sixteen days before the onset of illness.

Present illness.—On July 2 he first noted headache and malaise. There was one diarrheal bowel movement with some abdominal pain which soon disappeared. He thought he had fever and went to bed. The next day slight sore throat and a cough were noted. On July 5, the fourth day of illness, he noted a rash on the palms and backs of his hands, and on the tops and sides of both feet. Typhoid fever was suspected and he was sent to the hospital.

On examination the patient did not appear to be ill. He was bright and alert and had no complaints except malaise and anorexia. His face looked pale in contrast with rather unusually red lips. The conjunctivæ were injected and the tongue coated. Both dorsal and ventral surfaces of the hands and feet, the wrists and ankles, were covered with a maculopapular eruption which varied in shade from a pale pink to a dull rose-pink and faded somewhat on pressure. Some spots were petechial in character. The lesions on the palms were of irregular size and shape, slightly elevated, rose-red, and from 2 to 6 mm. in diameter. They made the hands feel somewhat stiff and sore. The rest of the physical examination was negative except for slight injection of the pharynx. The spleen was not palpable. The temperature was 40.2° C. (104.4° F.) and the pulse-rate 100. The leukocytes numbered 9,000 with 69 per cent polymorphonuclear cells. Because of the characteristic distribution and appearance of the eruption, the conjunctivitis and the season of the year, a tentative diagnosis of spotted fever was made.

Course of the illness.—Except for slight general aching and malaise the patient had no complaints at any time. The day after admission (the fifth day of illness) the eruption spread upward on all extremities and appeared on the abdomen, chest and back. The face was not involved. The eruption then commenced to fade and by the eighth day had nearly disappeared, leaving here and there a faint brownish spot. The temperature reached 40.3° C. (104.6° F.) on the fourth day of illness, but the peak on each succeeding day was lower until it did not rise above normal on the tenth day. The leukocytes on three occasions numbered about 9,000. Agglutinins in the serum for bacilli of the typhoid group, for tularemia and brucelliasis were absent. A blood culture was sterile.

Special procedures.—The blood serum taken on the fifth day contained agglutinins for *B. protus* X19 (the Weil-Felix reaction) at a titer of 1:100; two days after the temperature returned to normal the titer was still 1:100, but diminished to 1:50, ten days later. The titer was suggestive but was considered too low to be of diagnostic significance. A portion of skin from one of the well developed macules was examined histologically by Dr. Lynch, and showed the usual changes of a mild dermatitis without the endothelial proliferation and necrosis characteristic of spotted fever.

Four guinea pigs were each inoculated intraperitoneally with 4 c.c. of blood, fresh from the patient, on the fifth day of fever. Daily rectal temperature registrations of these animals failed to show any rise above 39.8° during a period of twenty-four days thereafter. On the eleventh day the temperature of one of the animals reached 39.8° C. Blood was immediately withdrawn and inoculated into two fresh animals neither of which developed fever during eighteen days of observation.

Blood taken from the patient a month after recovery was then sent to Dr. Parker at Hamilton, Montana, and to Dr. McCoy at the National Institute of Health in Washington, for protection tests. Guinea pigs were inoculated with the virus of the eastern variety of spotted fever virus by Dr. Parker and with the Bitterroot variety by Dr. McCoy after the virus in each case had been incubated with the patient's serum. The serum evidently contained no neutralizing power since both sets of inoculated animals developed the disease.

The foregoing tests, therefore, failed to provide confirmation of the clinical diagnosis of spotted fever. As a last resort two of the guinea pigs which had been originally inoculated with the patient's blood were sent to Dr. Parker for immunity tests. The other two animals died from undetermined causes, four weeks after inoculation. It is known that certain guinea pigs are resistant to relatively virulent strains of spotted fever virus and that strains of low virulence may give rise to "inapparent infection," that is, the animals suffer undetectable subclinical infection but at the same time become immunized. The surviving guinea pigs were, therefore, inoculated with virus of the eastern variety of spotted fever, together with two fresh control animals. Both control animals developed high fever on the third day with typical scrotal lesions. Our animals, however, were apparently partially immunized. One showed but two days of fever and the other low-grade fever for eight days; in neither was the scrotum affected, and both recovered. The temperature records are illustrated in Figure 1. This result confirmed the diagnosis and suggested two possibilities: (a) that the patient's blood contained the virus of spotted fever in an amount too small to provoke detectable disease in the guinea pig but large enough to cause immunity, and (b) that the strain of spotted fever present was of low virulence and was similar to the "Minnesota strain" previously studied.⁹

Discussion

It is highly probable that spotted fever is more prevalent in Minnesota than one would be led to believe. The discovery of the virus in ticks substantiates this view. The disease as it occurs here is probably often atypical and caused by a variety of virus of rather low virulence as far as can be determined from studies in guinea pigs. From previous experience there is evidence also that the virulence does not in-

crease by repeated animal passage since no essential changes in the course of infection were noted after the strain had been passed through more than 100 guinea pigs.⁹ This indicated that the strain in question was not an attenuated form of the highly virulent form, but represented a separate type of virus. We had suggested that the Minnesota variety may occupy an intermediate position between the highly virulent Bitterroot strain of spotted fever on the one hand and typhus fever on the other, because of several features possessed in common with both of these diseases in animal tests. Nevertheless, it appeared to be more closely related to the spotted fever group. The question has been more fully discussed by Zinsser.¹⁰ It will be of great interest to determine the nature of the virus causing the infection in adjacent states, which as yet has apparently not been done.

Diagnosis.—In regard to clinical diagnosis it is, of course, necessary to have the disease in mind. It occurs chiefly in the spring and early summer months, when ticks are most active. The history of a tickbite is of great importance, but occasionally is not forthcoming even in proved cases. The sudden onset with the characteristic rash appearing about the third or fourth day, first on the hands, feet, wrists, and ankles, the conjunctivitis and high fever, are cardinal diagnostic features. The leukocyte count is usually slightly elevated and the spleen is occasionally palpable.

A positive diagnosis can best be made by the various procedures mentioned in a preceding paragraph, namely, (a) the Weil-Felix reaction in high titer; (b) inoculation of 5 or 10 c.c. of fresh blood intraperitoneally into guinea pigs followed by fever and scrotal swelling; (c) a Weil-Felix reaction in the blood of inoculated animals which have recovered; (d) the protective or neutralizing power of patients' "convalescent" serum as tested by animal inoculation with known strains; and (e) immunity tests of animals previously inoculated with patient's blood by inoculating them with known strains of virus together with controls.

Previous experience with the Minnesota variety⁹ has shown that the strain is of low virulence for animals, and provokes a low degree of

immunity. These facts must be considered in immunity tests since the Bitterroot strain, and in some cases the Eastern variety, were apparently too virulent to be protected against by the mild local variety. The equivocal results of some of the biologic tests and the absence of pathognostic histologic skin changes in the case

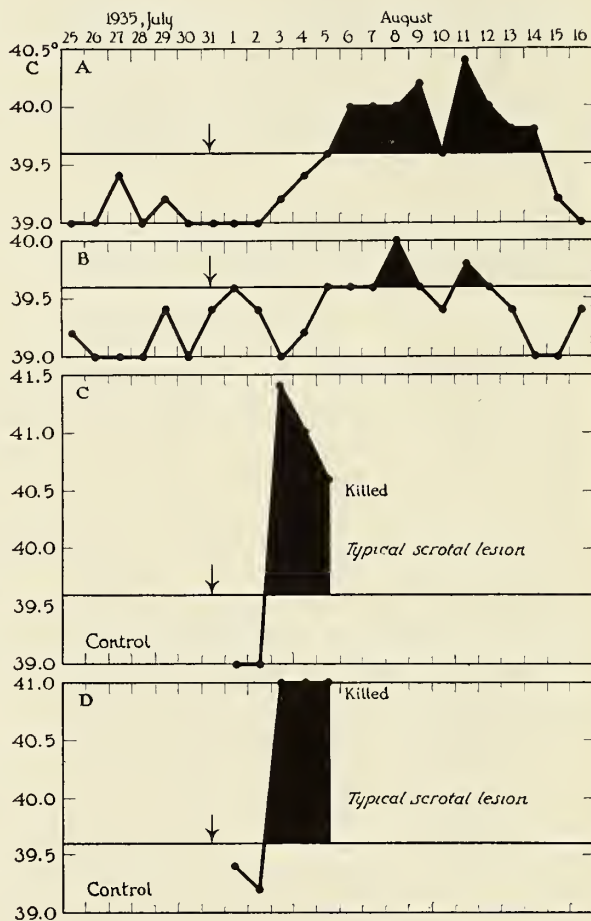


Fig. 1. Results of immunity tests with the eastern variety of spotted fever in guinea pigs. Animals A and B were inoculated with blood from the patient on July 7 but exhibited no evidence of infection. C and D were normal control guinea pigs. Animals A, B, C, and D were inoculated with eastern spotted fever on July 31 by Dr. Parker. C and D developed typical high fever on the third day and typical scrotal lesions. A and B reacted with moderate fever, no scrotal lesions and recovered, indicating that these animals were partially immunized by the previous inoculation of patient's blood and an inapparent infection.

here reported may have been due to the mildness of the infection caused by virus of low virulence as found in Minnesota. It also seems advisable to inject guinea pigs with larger amounts of blood (10 c.c.) from patients suspected of having the disease.

Summary

A case of spotted fever occurred in a young man resident in Minneapolis during the month of July. Certain clinical characteristics typical for spotted fever were present but the illness was exceptionally mild and lasted about ten days. The clinical diagnosis was confirmed by the fact that guinea pigs inoculated with the patient's blood were immunized against infection with a known strain of spotted fever. It is predicted that more cases of spotted fever will be discovered in Minnesota provided the disease is in mind and physicians become alert to this probability.

I wish to acknowledge, with thanks, the coöperation of Dr. Parker, Dr. McCoy and of Dr. Orianna McDaniel in the biologic tests involved in the diagnosis.

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ACUTE CORONARY THROMBOSIS WITHOUT CHARACTERISTIC PAIN AND WITHOUT SYMPTOMS OF SHOCK

Report of Three Cases

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FOR several years the clinical picture of coronary thrombosis has been so well and so minutely described that a very definite and typical picture and a constant group of symptoms have been accepted as occurring in this condition, but it is only in recent years that severe angina pectoris and coronary sclerosis have been distinguished from acute coronary thrombosis. In most instances these conditions can now be differentiated without difficulty.

One is accustomed to think of the clinical picture of acute coronary thrombosis as a condition affecting a man, usually past forty years of age, who for a year or so has had angina pectoris. While at work or while at rest, or even during sleep, he may suddenly feel a dull or heavy pain under his sternum or in the epigastrium. He usually thinks of this as indigestion, and in the early stages it does have that appearance. This is one reason why in the past the diagnosis of acute coronary thrombosis was most always that of "acute indigestion." The pain persists and

becomes so severe in a few minutes or an hour that the patient becomes frightened, and rightly so, and he feels that he is in a grip with death. This fear of impending death may be very striking, may be almost as distressing as the pain, and it may be depressing for the physician to have to stand by and observe it.

When this feature is extreme, the prognosis is usually very grave. The patient feels sick and nauseated and he may actually vomit. He will break out in a cold sweat in his anguish. The pain keeps relentlessly on, and increases, and it may become unbearable.¹ It may extend through to the patient's back and up into the neck along the great vessels; it often extends down one or both arms. The patient will often state that he has a sense of constriction; he feels as if he is being squeezed in a vise. He becomes more anxious and his agony increases. He may be unable to keep quiet and he often will turn restlessly in bed or get up and pace the floor. If he does not succumb to the attack, the pain usually will begin to abate after one, two, or more hours. Usually the pain is so severe that some

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medicine has been given for relief, usually morphine. As a rule, the patient is quite dyspneic. This feature may vary considerably, from slight to very severe dyspnea; the patient may actually struggle to get his breath.

On physical examination one of the first things noticed is the extreme distress and the fact that the patient is dangerously ill. He is usually white and pale, restless, and bathed in a cold sweat. His first complaint will be of pain, and second, shortness of breath. Listening to the heart does not often indicate the grave nature of the attack. Often the pulse is regular and only moderately increased in rate. The blood pressure will be very low, and often one is not able to ascertain the diastolic pressure. The picture is one of extreme shock. A ruptured upper abdominal viscus will often give practically an identical picture.

Lately we have become so accustomed when we think of acute coronary thrombosis to picture in our minds the foregoing description, that we fail to recognize the mild attacks, or the cases that do not present this typical picture.

We are presenting three cases in which the symptoms were very mild. They did not have the characteristic pain or symptoms of shock, and if it had not been for the aid of the electrocardiogram, we doubt if a correct diagnosis could have been made.

Report of Cases

Case 1.—A business man, sixty-five years of age, came to the clinic complaining of attacks of substernal pain for the previous ten days; these attacks had not always been brought on by exertion. Pain was projected down the inner side of both arms, the attacks lasting only a few minutes. At 10 a. m. of the day of admission he had had an attack while walking and he had had to remain quiet for a few minutes. He had broken out into a sweat and his fingers had become numb and white. In a short while he had been able to return to his work again. A dull, aching pain with a few sharp pains in the chest had remained, however, and in the afternoon he walked to the clinic for examination. His past history was essentially negative except for appendectomy for acute appendicitis in July, 1935. There was no family history of heart trouble.

On examination the patient did not appear to be ill. There was no cyanosis, dyspnea, or increased perspiration. The pulse rate was 68 beats per minute and respirations 18 per minute; the temperature was 97.8° F. The heart tones were regular and of fair quality. On percussion there was no demonstrable enlargement of the area of cardiac dullness. The blood pressure was found to be 138 mm. of mercury systolic and 80

diastolic. The lungs were negative to percussion and auscultation. The liver was not palpable nor was there any peripheral edema.

An electrocardiogram taken at 4 p. m., six hours

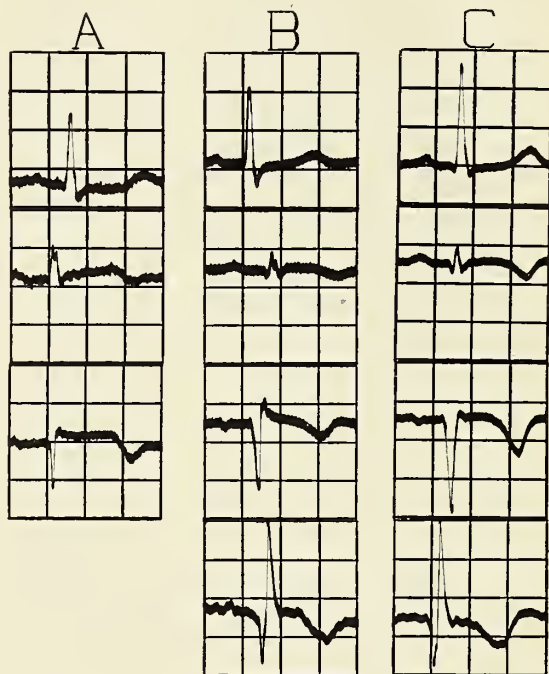


Fig. 1 (Case 1) *A*, Six hours after acute coronary thrombosis: the T wave in derivation II is diphasic and is inverted in derivation III; the R-T segment is depressed in derivation I and elevated in derivations II and III, and the Q wave in derivation III is lengthened; *B*, standard and fourth leads taken two days after acute coronary thrombosis; in addition to what is shown in *A*, the T wave in derivation II is inverted and the changes in the R-T segments are more pronounced, the fourth lead showing inversion of the T wave, and *C*, standard and fourth leads taken four days after acute coronary thrombosis; there is no decided change from *B*, and the R-T takeoff in the third lead is not quite as high in *C* as in *B*.

after the attack of substernal pain (Fig. 1), disclosed diphasic T waves in derivation II and inverted T waves in derivation III. There was depression of the R-T segment in derivation I, elevation of the R-T segment in derivations II and III, and a lengthened Q wave in derivation III. An electrocardiogram taken the following day showed, in addition, inverted T waves in derivation II and a change in the contour of the S-T segments in derivation III. The Q_3 and T_3 patterns in the electrocardiogram were characteristic of acute infarction involving the posterior basal portion of the left ventricle.

On admission to the hospital the same evening the leukocyte count was 9,600 per cubic millimeter of blood, and on the next three successive days was 7,000, 9,200, and 9,700 cells per cubic millimeter respectively. On the second and third days in the hospital the patient had a temperature of 100.8° F. There was no significant change in the blood pressure at any time and convalescence was uneventful.

Case 2.—A civil engineer, aged 60, came to the clinic complaining of an intermittent "burning pain" in the

back of his neck of about ten years' duration. Physical activity would often bring on this pain and, if this were moderated, relief often would follow. The relation of the pain to exertion was not constant, however, and

to the clinic complaining of attacks of precordial pain of one to three minutes' duration with projection into the shoulders and neck. He had had these attacks daily for the previous week; none of them had been related

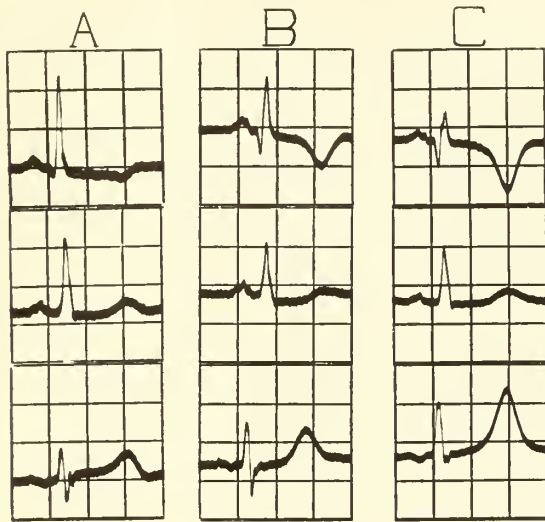


Fig. 2 (Case 2) *A*, Before acute coronary thrombosis, showing inversion of T wave in lead I, *B*, thirty hours after acute coronary thrombosis, showing a definite change of the R-T segment in derivation I, diphasic T waves in derivation II, and lengthened Q wave in derivation I, and *C*, nineteen days after *B*, showing exaggeration of the T wave in derivations I and III; the elevation of the S-T segment in derivation I is slightly increased over that in *B*.

the pain was not projected to the arms. Because his brother had recently died of "angina pectoris," he was much concerned about his condition. On the morning after admission to the clinic he had a similar attack of pain after "setting up" exercises, with projection of the pain to the upper part of the sternum but none down either arm. He had not perspired nor had he had a sense of impending doom with this.

On examination the patient did not appear acutely ill. There was no dyspnea, cyanosis, or signs of shock. The pulse rate was 60 beats per minute and the heart tones were of good quality. No arrhythmia was present. The blood pressure was found to be 180 mm. of mercury systolic and 100 mm. diastolic. Examination of the thorax was negative. Roentgenograms of the cervical and thoracic spinal column revealed rather marked hypertrophic changes. The electrocardiogram showed left ventricular preponderance and inverted T waves in derivation I (Fig. 2).

The patient was sent to the hospital for further observation and study. On the first day his temperature rose to 99.8° F. and the leukocyte count was 13,100 per cubic millimeter of blood. A second electrocardiogram disclosed a definite change in contour of the R-T segment in derivation I and diphasic T waves in derivation II. Subsequent electrocardiograms also revealed lengthened Q waves in derivation I and exaggerated T waves in derivations I and III. The patient's course in the hospital was uneventful.

Case 3.—A white man, fifty-seven years of age, came

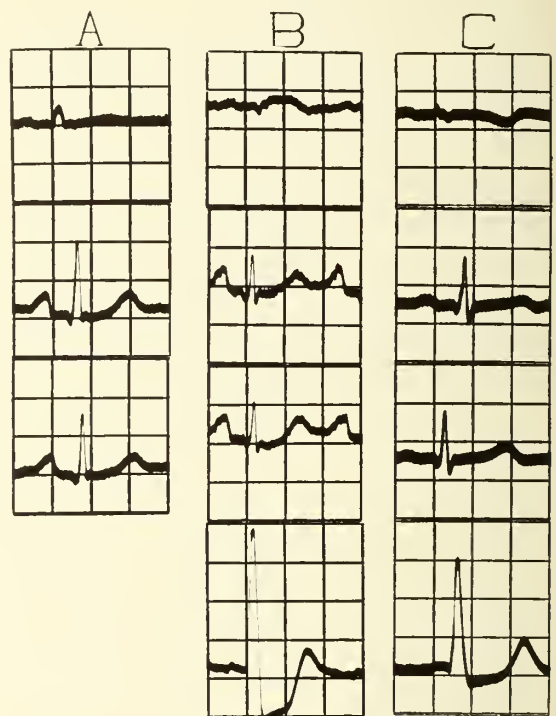


Fig. 3 (Case 3) *A*, Four months before acute coronary thrombosis: other than a low amplitude in derivation I, this electrocardiogram is essentially normal; *B*, standard and fourth leads taken twenty-four hours after acute coronary thrombosis, showing an inverted T wave in derivation I, with elevation of the S-T segment in derivation I and depression of the R-T segment in derivation III; the T wave in derivation IV is positive, and *C*, standard and fourth leads taken fourteen days after *B*; the changes in *C* are practically the same as in *B*.

to physical exertion, but a few had come on during excitement. Six months previously the patient had come to the clinic because of a similar attack, and at that time the examination and electrocardiogram had been negative. From that time until this present series of attacks, he had experienced no distress in his chest. The attack the day before admission had left a soreness in the epigastrium for several hours. He had had no perspiration, weakness, or dyspnea with the attack. Except for right herniotomy in 1926 and right ureterolithotomy in 1932, his history was essentially negative. His mother had died of heart disease at an old age. The family history otherwise was negative.

On examination the patient appeared to be comfortable and did not seem to be having any pain. There was no dyspnea, cyanosis, or increased perspiration. The respirations were 20 per minute, the pulse rate 120 beats per minute, and the blood pressure 180 mm. of mercury systolic and 110 mm. diastolic. Examination of the lungs was negative. The heart tones were of good quality and examination of the heart gave essentially negative results. On abdominal examination

the liver was not palpable. The electrocardiogram revealed an inverted T wave in derivation I with a change of contour of the R-T segment in this derivation. There was elevation of the R-T segment in derivation I and depression of the R-T segment in derivation III. The T wave in derivation IV, taken by the Wolferth method, was positive. Subsequent electrocardiograms revealed similar changes (Fig. 3).

During his first day in the hospital the patient's temperature was 100.2° F. and the leukocyte count was 13,900 per cubic millimeter. In the next four days the leukocyte count dropped to 7,500 per cubic millimeter. The patient's course in the hospital was uneventful.

Comment

These cases are of interest because, clinically, they did not present the picture usually seen in cases of acute coronary occlusion and it was impossible to establish the diagnosis positively the first day. The diagnosis was not established until

after the patients had been hospitalized and studied for a day or so. The diagnosis could easily have been missed or passed as that of angina pectoris with coronary sclerosis.

When one considers the wide variation in the pathologic process in these cases, that is, the variation from occlusion of a very small branch—not complete occlusion at all but extreme narrowing of the coronary artery, with resultant small myocardial infarction—to complete sudden occlusion of one of the coronary arteries or one of its main branches, with resulting large infarction, it is not difficult to explain why there is such a variation in the clinical picture.

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THE AMBULATORY TREATMENT OF AURICULAR FIBRILLATION WITH QUINIDINE*

A Five-Year Follow-Up Study

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QUINIDINE is, perhaps, finally reaching the place it deserves as a therapeutic measure in the treatment of heart disease. Much has been written for and against its use in the treatment of cardiac disease since the drug was introduced by Frey³ in 1918. As early as 1922 Robert Levy¹¹ concluded after a study on fifty cases of auricular fibrillation "that the danger of emboli accidents after quinidine has been given undue emphasis." Then in 1923 Viko, Marvin, and White¹⁷ concluded that the danger of accidents with quinidine is not much greater than with any other form of treatment. Again in 1923 Korn⁹ asks whether the cases of embolism from use of quinidine in auricular fibrillation are more frequent than those which commonly occur in fibrillation treated with digitalis or is it that we hear more of them by reason of the prominence of quinidine in the medical literature. It has been known for some time, as shown by MacKenzie,¹³ that cerebral emboli occur in cases of auricular fibrillation treated with

digitalis. Emboli have been known to occur in individuals with auricular fibrillation who have had no treatment whatsoever.

Recently a middle aged woman who had mitral stenosis and auricular fibrillation came to the clinic. After she was told of her condition she asked if her local physician could treat her. She was referred back to her own physician, who gave her only digitalis. She was on this treatment for several weeks. She appeared again at the clinic, this time with an additional complaint. She had a severe pain in the calf of her left leg. Examination disclosed an embolus in the posterior tibialis artery. Had she been on quinidine no doubt the drug would have been blamed for the accident.

Morowitz and Hochrein¹⁴ in 1927 began using quinidine as a prophylactic measure to prevent fibrillation and acute heart failure in decompensated hearts. Since adopting this measure their results, they say, have been better. Levine¹⁰ in 1932, experimenting on cats, found that quinidine raises the threshold for ventricular fibrillation by faradic stimulation threefold, from 0.20

*From the Department of Cardiology, University of Minnesota Medical School. Read before the Southern Minnesota Medical Association, Austin, Minn., August 26, 1935.

TABLE I

Etiology	Name	Age	Duration of fibrillation	Duration of regular rhythm
Rheumatism	Mr. B.	31	1 year	1 month
	Mr. O'B.	69	3 years	4 months
	Mrs. H.	37	9 months	7 days
	Mrs. M.*	46	3 years	4 years
	Average	46		Average 13¼ months
Coronary disease and hypertension	Mrs. G.*	62	2 years	5 years
	Mr. L.	59	1 month	0-9 months
	Mr. F.	74	Several months	1-6 months
	Mr. S.	61	8 months	1-7 months
	Mr. W.	66	3 years	0-3 months
	Mr. A.	73	3 years	0-3 months
	Mrs. M.	62	2 years	0-3 months
	Mr. Os.	66	10 months	1 month
	Mr. Or.*	53	6 months	4 years
	Mr. P.*	67	9 months	4 years
	Average	64.3		Average 26 months
Diabetes and hypertension	Mrs. H.	70	Over 10 years	9 months (can't trace)
Lues and aortitis	Mr. McK.	62	3 years	4 months
No apparent heart disease	Mr. B.*	73	2 years	5 years

*Still regular as of May, 1935.

amperes before giving quinidine to 0.60 after administration of the drug. He suggests the use of quinidine in those conditions in which fibrillation is prone to occur. Recently Nathanson,¹⁵ working on humans, has shown that quinidine taken by mouth may prevent increased ventricular rhythmicity (the basis for ventricular fibrillation) and advocates its use in cases of angina pectoris showing evidence of ventricular irregularities.

In 1930 it was the writer's opinion that the dangers attributed to the use of quinidine had

probably been over-emphasized and that a trial of the use of the drug in ambulatory patients of auricular fibrillation was perhaps justified. Twenty-four unselected cases of auricular fibrillation from the outpatient department of the cardiac clinic at the University of Minnesota were treated. Seventeen, or 70 per cent, were restored to normal rhythm.¹⁸

It is the purpose of this study to give a five-year follow-up report on the seventeen cases that were restored to normal rhythm.

Duration of Restored Normal Rhythm

Table I and Graph I give a five-year follow-up study on the duration of restored normal rhythm in the seventeen successfully treated patients. It will be observed that five, or over 20 per cent of the original twenty-four patients treated, are still regular. One has been regular now for five years, and four have been regular for four years; and every one of these five patients is active and carrying on with his daily duties.

The average age of the rheumatic group was about forty-six years, about eighteen years younger than the coronary and hypertension group. The average duration of normal rhythm of the rheumatic group was about thirteen months, or about 50 per cent of that of the hypertension and coronary group. The average duration of restored rhythm in the hypertension

GRAPH I. DURATION OF RESTORED NORMAL RHYTHM

		1 yr.	2 yrs.	3 yrs.	4 yrs.	5 yrs.
Mr. Os.	1 yr.					
*Mr. Or.	4 yrs.					
Mr. McK.	9 mos.					
Mr. B.	1 mo.					
Mrs. Ha.	4 mos.					
Mrs. M.	3 yrs.					
Mr. O'B.	3 mos.					
Mr. A.	4 mos.					
Mr. W.	3 mos.					
Mr. S.	1 yr.					
Mr. F.	7 mos.					
*Mr. B.	1 yr.					
Mr. H.	6 mos.					
Mrs. H.	7 days					
*Mrs. M.	4 yrs.					
*Mrs. G.	5 yrs.					
Mr. L.	9 mos.					
*Mr. P.	4 yrs.					

*Still regular as of May, 1935.

and coronary group was about twenty-six months. often attributed to the drug is that the primary (first) doses usually advocated are too large.

It has been our experience, like that of James, If given carefully a patient rarely complains of

TABLE II

Name	Etiology	Age	Duration of fibrillation	Regular
Mr. Or.	Coronary	57	6 months	4 years
Mr. B.	No apparent heart disease	77	2 days	4 years
Mrs. M.	Rheumatic	50	3 years	4 years
Mr. P.	Hypertension and coronary	71	9 months	4 years
Mrs. G.	Hypertension and coronary	67	2 years	5 years

son,⁶ Hay,⁴ Clark-Kennedy,¹ Kohn and Levine,⁸ that fibrillation due to rheumatic disease is much more difficult to restore to normal rhythm and maintain normal than the other types. The hypertension and coronary patients respond quite readily to quinidine therapy and are apt to maintain a normal rhythm for longer periods.

Table II gives a résumé of the five patients who are still regular. It gives the etiology, present age, and duration of the auricular fibrillation. Every patient is fifty years of age or over. The average age of the group is over sixty-four.

These patients have been kept under constant observation and are on maintenance doses of quinidine. There have been times when Mrs. M., Mr. P., and Mr. Or. have become irregular, temporarily, when out of medicine; but they were always readily restored to normal rhythm by resuming the use of quinidine. Perhaps the chief reason why patients with auricular fibrillation who have been restored to normal rhythm sooner or later begin to fibrillate again is that they do not continue the regular maintenance doses of quinidine. They usually feel so well that they begin to get careless, thinking that they do not need to continue taking medicine. Then, sooner or later, fibrillation returns. It is very important that a maintenance dose of quinidine be taken daily. If this entire series of seventeen patients could have been kept under better supervision there no doubt would have been more than five still regular.

Method of Treatment

The method of treatment, I believe, is very important. Two things should be remembered: (1) that the dose to begin with should be very small; and (2) that the quinidine should be given at short intervals of time, not over two hours apart.

The reason, perhaps, for the toxic effects so

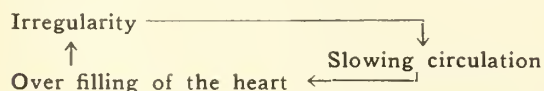
any gastric disturbances or nausea, or experiences any cardiac effects. The following procedure I have found effective. First digitalize the patient, slowing the pulse down to 70-80. Then start the quinidine, continuing a maintenance dose of digitalis. The first day give the patient one dose of 1.5 grains (0.1 gm.); the next day give him 1.5 grains (0.1 gm.) at 8 a. m. and another at 9 a. m.; the next day 1.5 grains (0.1 gm.) each hour for three doses; the following day the same dose four times; then increase the dose to 3 grains (0.2 gm.) each hour for three doses; the following day 3 grains each hour for four doses. Then give 5 grains (0.33 gm.) at 8, 9, and 10 a. m.; the next day 5 grains (0.33 gm.) for four doses. Then you increase the dose more rapidly, to 10 grains (0.67 gm.) each hour for three doses. I usually find that if the fibrillation is not restored to normal rhythm after giving 30 grains (2.0 gm.) of quinidine daily for a few days the heart will not maintain a normal rhythm for a very long period even if it is restored to normal rhythm by larger doses.

By using the small dose method, the patient develops a tolerance for the drug and very rarely experiences any toxic effects. The reason for giving quinidine at one or two hour intervals is that at the end of an hour the drug is practically eliminated from the blood stream¹⁹ and when given at intervals of four to six hours the drug is not used to the best advantage. Larger doses have to be given each time to get the desired results, and in so doing the danger of toxic effects is much more possible.

After the heart is restored to normal rhythm the same dose of quinidine should be maintained for a few days only. After that time the doses should be diminished each day, 5 grains or so a day, until a maintenance dose is established. My experience has been that about 10 grains

is the average amount of quinidine, taken daily (given in two 5-grain doses one hour apart), that will maintain a normal rhythm. In some cases I give 10 grains one day alternating with 5 grains the next. Some can maintain a normal rhythm on only 5 grains daily. Each case must be studied independently.

A question often brought forth is, are these patients afflicted with auricular fibrillation any better off after the heart is restored to normal rhythm than they were with a slow fibrillating heart under control of digitalis. Might one not as well ask, is an engine whose efficiency can be increased 20-30 per cent any better for the running power of a motor car? It is quite evident that a manufacturer of automobiles, or any other motor device, would consider such an increase in power a most remarkable engineering feat. That is just exactly what happens when a fibrillating heart is restored to normal rhythm. In 1920 Eyster and Swarthout,² experimenting on dogs, showed that the cardiac output in a fibrillating heart was diminished 15-79 per cent. Later Lewis,¹² working on dogs and cats, demonstrated that the minute volume of a fibrillating heart decreased about 20 per cent. Then, in 1930, Smith, Walker, and Alt¹⁶ showed that the minute volume increased about 30 per cent when normal rhythm was established in fibrillating hearts that had previously been treated with digitalis. In our clinic, Kerkhof's⁷ studies on nine cases of mitral stenosis with auricular fibrillation resulted in similar findings. Some of the patients were decompensated. These patients were treated with digitalis until well compensated and until the ventricular rate was between 60 and 70. After these patients were restored to normal rhythm by the use of quinidine, he found that the average minute volume increased 30 per cent. Some time ago Hirschfelder⁵ emphasized that point, saying "the mechanical effect of any arrhythmia is to slow the circulation. This leads to an increased pressure in the veins and upon a cardiac muscle whose tone is diminished, establishing a 'vicious circle.'"



These five cases that I have mentioned as still being regular, with the exception of Mr. B., whose heart was irregular only a few days

before being restored to normal rhythm, were chronic cardiac invalids. They could not carry on with their daily duties. They have become useful citizens during the past four or five years. Needless to say these patients are very happy and most grateful. The reason is evident: they are no more heart conscious; they do not feel that palpation and irregular beating; their cardiac efficiency has increased about 30 per cent, which is a considerable gain. Their tolerance for carrying on has increased considerably, they are again useful, independent, and self supporting citizens.

Conclusions

1. A five-year follow-up study on the ambulatory treatment of auricular fibrillation is presented.
2. Quinidine is a valuable drug in the treatment of auricular fibrillation.
3. It is important that the drug be given in small doses to begin with, and at short intervals. This method helps the patient to establish a tolerance for the drug, thereby avoiding the toxic effects so often attributed to its use.

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HUGE OVARIAN CYSTS

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HUMAN curiosity seems unable to resist the lure of the unusual; collections of the "smallest," the "biggest," the "oldest," and so forth, have always been interesting to the majority of people. Physicians are no exception to this. "Believe it or not" has become almost a byword.

Recently, at The Mayo Clinic, a simple cyst, weighing about 10 kg., was removed from the right ovary of a girl, seventeen years of age. There was nothing concerning the case which warranted reporting it except that it was the "largest simple ovarian cyst" of a girl of that age seen at The Mayo Clinic in the past thirty years. Stimulated by this case, we thought it would be interesting to review similar cases in which examination had been made since the founding of the clinic.

On January 24, 1888, Dr. C. H. Mayo removed a cyst weighing 65½ pounds (about 30 kg.) from the left ovary of a woman, aged twenty-three years. A cyst weighing 32 pounds (about 15 kg.) had been removed from the patient's right ovary five years previously. The woman had married and had been delivered of a child within a year following the first operation. An incisional hernia had developed during the pregnancy, and the left ovarian cyst had protruded through this and hung down to the patient's knees at the time of the second operation. That same year Dr. Mayo removed a simple cyst of the right ovary, weighing 36½ pounds (about 16 kg.) from a woman, aged forty-six years, and a multilocular cyst, weighing 40 pounds (about 18 kg.) from the right ovary of another patient.

On June 1, 1920, Dr. W. J. Mayo removed a simple cyst of the left ovary, measuring 60 cm. in diameter and weighing 82 pounds (about 37 kg.), from a woman, aged fifty-three years. She had been aware of gradual enlargement of the abdomen in the past twelve years, and operation had been advised nine years previously. Her only complaint was of moderate dyspnea two weeks previous to operation; she had car-

ried on all of her household duties until that time. She had gained 47 pounds (about 21 kg.) during the past ten years but appeared to be extremely emaciated. October 21, 1922, Dr. W. J. Mayo removed a carcinomatous cystadenoma of the right ovary, weighing 100 pounds (about 45 kg.) from a woman, aged sixty years.



Fig. 1. Appearance of abdomen before removal of large ovarian cyst.

This immense tumor had protruded through an umbilical hernia which had developed during labor, thirty years previously. The patient's husband had made a large harness with which to support the herniation so that the woman could go about her household duties. October 30, 1924, Dr. Mayo removed a multilocular cystadenoma of the left ovary, which weighed 50 pounds (about 23 kg.), from a woman aged forty years. She gave a history of general discomfort and enlargement of the abdomen for the previous four years.

April 22, 1935, Dr. Pemberton removed a multilocular pseudomucinous cystadenoma, weighing 51 pounds (about 23 kg.), from the right ovary of a girl, aged nineteen years. Her relatives had first noticed the enlarging abdomen in 1931; they said that they had been told it

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was attributable to poor posture. Later an "herbiologist" was consulted. Thereafter, the patient waited two and a half years for the tumor to disappear, but without result (Fig. 1).



Fig. 2. Distention of abdomen in Concato's disease.

When she was examined at the clinic her only complaints were of moderate dyspnea on exertion and inability to eat a normal amount of food at one time; therefore, she had eaten small amounts of food at frequent intervals.

Dr. Counsellor reported a case in which the patient was aged fifty-four years. The abdominal enlargement had been gradual and painless for twenty-two months. During the six months before her examination she had noticed a constant feeling of pressure in the rectum and marked varicosities had developed in both lower limbs. A multilocular pseudomucinous cystadenoma, weighing 40 pounds (about 18 kg.) was removed from the left ovary, on November 1, 1935.

In consideration of enlargement of the abdomen, caused by ovarian cysts, it seems worth while to mention a case reported by Dr. W. J. Mayo in 1922. A woman, aged twenty-two years, two years before her visit to the clinic, had undergone an exploratory operation because of an enlarging abdomen and a diagnosis had been made of inoperable carcinoma. The abdomen had enlarged again after operation, and she was then examined by Dr. Mayo, who removed a bilateral intracystic and extracystic papillary cystadenoma of the right ovary, which weighed 139¼ pounds (about 63 kg.). The weight of the specimen, plus the weight of the fluid which was present in the cyst and free in the abdomen totaled 161 pounds (73 kg.). Before operation, the patient weighed 277 pounds (about 125 kg.). Ten days after operation she

weighed 119 pounds (54 kg.), a loss of 158 pounds (about 72 kg.). This proved to be a case of Concato's disease (polyserositis), and is without an equal at The Mayo Clinic, so far as enlargement of the abdomen is concerned (Fig. 2).

Recently, one of us (C. W. Mayo) removed a simple cyst of the left ovary, measuring 32 by 28 by 17 cm., and weighing 21⅔ pounds (about 10 kg.) from a girl, aged seventeen years. On January 17, 1936, one week later, he removed a simple cyst of the right ovary, measuring 30 by 28 by 21 cm., and weighing 22¼ pounds (also about 10 kg.), from a girl, nineteen years of age. Histories given by these two girls were practically identical. Both had noticed gradual, painless enlargement of the abdomen, during the last eighteen months. Both had been active in university life, including athletics, until they came to the clinic. Neither had experienced any gastro-intestinal or genito-urinary distress. In each case, physical examination did not reveal any abnormality except the distended abdomen. Laboratory tests gave entirely negative results. Diagnosis centered on abdominal ascites, tuberculous peritonitis, and huge ovarian cyst.

In the differential diagnosis of disease associated with distended abdomens, the following suggestions are worthy of consideration: The general contour of the abdomen, in cases of large ovarian cysts, tends to be rounded in both directions, whereas, in cases of marked abdominal ascites, the contour is flattened. When possible, a digital examination, with one finger in the rectum and one in the vagina is helpful. If there is a general bulging of the cul-de-sac of Douglas, when pressure is applied to any place on the abdomen, the cause of the distention is more likely to be ascites than ovarian cyst. However, it is not always possible to make a digital examination; for instance, if an intact hymen is present. Examination of the pelvis in cases of large, distended abdomen, even under the best conditions, presents many difficulties. One is more likely to receive impressions rather than to ascertain facts from such examination. If the motion of the uterus is limited, the diagnosis of ovarian cyst is suspected; however, if the uterus is freely movable, ascites is more likely to be present.

Roentgenologic examination, after the administration of a barium enema, is of assistance in

differential diagnosis. The colon is found to be pushed to the periphery of the abdominal cavity if a large cyst is present. This is characteristic of any large mass lying extrinsic to the colon and is not seen otherwise. The sedimentation rate of erythrocytes is increased if the distention is caused by tuberculous involvement of the peritoneum; hyperpyrexia usually occurs in the late afternoon in such cases.

The infrequency of any symptom other than a gradual, painless enlargement of the abdomen was significant in the great majority of the histories which we reviewed. Gastro-intestinal, genito-urinary or circulatory symptoms were gener-

ally absent except that several patients had had moderate dyspnea when the abdomen was considerably distended. The patient usually has noticed some loss of flesh in the face and limbs, although the scales point to an increase in weight. This increase before operation seldom compensates for the weight of the cyst when it is removed.

Even with the help of these diagnostic aids, diagnosis continues to be most difficult in some cases. Continuous caution should be exercised in order that abdominal paracentesis is not performed rather than oöphorectomy in cases of large ovarian cyst.

OVULATION PAIN*

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TWO clinical signs of ovulation in the human being have been recognized by gynecologists, namely, the intermenstrual pain or "Mittelschmerz" and intermenstrual spotting. The former is probably due to the greatest distention of the follicle just preceding rupture. It is not common. It may be perfectly regular, occurring on one side one month, and on the opposite side the next. Or only one side may be painful, distention of the ovary on the opposite side causing no pain. Some abnormality in innervation of the ovary is probably responsible for the phenomenon reaching consciousness. Intermenstrual spotting occurs quite infrequently. It may last from one hour to forty-eight hours, and the bleeding may be very slight or moderate.

As a third indication of the time of ovulation we get a sudden appearance of the follicle stimulating hormone (prolan A) in the urine of normal nonpregnant women.

The appearance of a positive prolan A reaction in the urine in these patients at about the middle of the intermenstrual intervals immediately suggests that this excretion is closely related to the phenomenon of ovulation. It has now been definitely demonstrated that the stim-

ulus for ovulation proceeds from the anterior lobe of the pituitary gland, the site of elaboration of prolan A.

Clinically, it is thought that the "Mittelschmerz" is due to the greatest distention of the follicle, *i.e.*, just prior to rupture. However, normally, ovulation is not associated with pain.

Ovulation pain recurs regularly at the same time in the intermenstrual cycle, usually about midway between each two menstrual periods. The condition is not common and diagnosis of intermenstrual pain should not be made unless the pain recurs at about the same time for at least a number of months. During periods of amenorrhea as in pregnancy and lactation, the attacks of pain are absent. The pain, which is not characteristic, is usually confined to one iliac fossa but sometimes to both. It usually lasts a few hours but may endure for days, although in the latter case it is not steady. In about 50 per cent of the cases of intermenstrual pain there is a vaginal discharge present during the attack. The discharge may be watery, mucous, yellowish and occasionally bloody. In some cases in which the discharge is bloody or blood-stained there is a local cause for bleeding, such as a polyp or submucous fibroid. However, as Hartman¹ points out, "the bleeding associated with inter-

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menstrual pain may be a pathologically accentuated expression of a phenomenon that occurs in some animals." Many individuals regard as menstruation the visible periodic bleeding of bitches. This designation is wrong, as evidenced by its time relation to ovulation. The bleeding precedes and accompanies ovulation and hence should be called "proestrous bleeding." A similar and homologous bleeding occurs at the cotyledons of the cow. A final proof of the homology is Hartman's discovery of the intermenstrual bleeding in the monkey, which frequently occurs in the middle of the menstrual cycle. It is usually microscopic, is always less than in the dog, and is, in both species, a concomitant of the congestion that accompanies the presence of a maturing follicle. Hartman wonders whether future study will not show that intermenstrual bleeding in the human female is physiologic and normal rather than abnormal.

Most of the women afflicted with intermenstrual pain are young, but the attacks of pain rarely make their appearance with the onset of puberty. The attacks may recur for many years, even lasting throughout the entire reproductive period. A large proportion of these women are sterile. The menstrual periods are usually normal, and, if dysmenorrhea is present, it is usually much less severe than the intermenstrual pain. Many, but by no means all the women who suffer intermenstrual pain, have pelvic disease.

Case History

The patient, Mrs. H., was a married woman, thirty-two-years of age. The family history was negative. She had two children, two and three years old. Her menses were regular. Her general health had been fair. She had had no major illness.

Her present complaint consisted of pain between her menstrual periods. The pain started through the rectum, gradually working into the vaginal opening, and upward. It was a shooting pain, and at times was very severe. The first attack occurred about May, 1934. It was not severe, and the patient did not pay much attention to it. It came in the middle of her menstrual period and lasted for two hours. The second attack occurred the last part of November. The pain started at noon, and was quite severe until about 5:30 p. m. She was given morphine hypodermically, with very little relief. The pain lasted through the night, until 8 o'clock the next morning. Then another hypo-

was given, and by 11 a. m. the pain was gone. This attack occurred eighteen days after the first day of her menstrual period. In none of the attacks did any spotting occur, except that there was a vaginal discharge at that time. The third attack came on Christmas day, exactly eleven days after the first day of her menstrual period. This attack started with shooting pain through the rectum, the pain working into the vagina. The pain started about 9 o'clock in the morning. She took several morphine tablets, and a hypodermic was given. The pain disappeared about noon of the next day. The hypodermic gave some relief, but she was not relieved entirely.

On physical examination the patient appeared acutely ill, weighing 101 pounds. Findings in examination of the head, heart and lungs were negative. The abdomen was very tender throughout, with no localization areas, but some tympanitis. Pelvic examination showed uterus and adnexa normal to palpation, but very tender. Urine was negative. The hemoglobin was 72 per cent, the white blood count 6,000.

The conditions to be considered in differential diagnosis were endometriosis, ectopic pregnancy, twisted ovarian pedicle and gastro-intestinal disturbances, especially appendicitis. Ectopic pregnancy and twisted ovarian pedicle are more likely to be attended with fulminating than with mild hemorrhages, so that in either instance operative treatment is necessary. The pain and tenderness of endometriosis is usually more intense near the time of menstruation and subsides during the intermenstrual period. Furthermore, they more frequently occur later in the reproductive cycle. In appendicitis the symptoms are progressive, while in a mild hemorrhage the symptoms are slight and do not progress to any great extent. A carefully taken history of the onset of the symptoms, and attention to the localization of the pain and tenderness, were therefore extremely important.

Ruptured ectopic pregnancy usually gives the history of one or more abnormal menstrual periods; there is usually some vaginal bleeding; softening of the uterus just proximal to the internal os may be present, and the breasts may show the changes of early pregnancy. If there is bleeding from the uterus, not menstrual in type, the case is probably not one of ovarian hemorrhage.

Treatment consisted of antuitrin S. Seven doses in all were given, starting immediately after the intermenstrual cycle—four after one cycle and three after another.

The patient has had no attacks since treatment was instituted. This treatment was initiated on the basis of very favorable reports in the literature, but the rationale was not definitely established.

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HORMONAL EFFECTS IN WOMEN

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TO a considerable extent the physiological activities of the body are governed and made to function in an orderly manner through the influence of hormones produced in the ductless glands. As an example of such action, none appears more amazing than does the hormonal control of the phenomena which comprise the reproductive mechanism in women. A number of glands are involved, producing in rhythmic sequence a series of tissue and organic reactions of considerable scope and magnitude.

Clinically, the exercise of this hormonal function is best expressed and is most easily understood by considering four critical events which illustrate the operation of the whole mechanism. These are puberty, menstruation, pregnancy, and the menopause. Departures from normal may also be as readily understood from this viewpoint as from any other.

Normally, puberty finds the young girl sufficiently grown to accept the possibilities of sexual maturity. Even normally, however, puberty may be reached by some at ten, by others at fifteen years or later. It may be further hastened or delayed by pathological processes, and in laboratory animals sexual maturity may be artificially produced while body growth is still infantile. Puberty marks the period when the ovaries, stimulated by the gonadotropic hormones of the anterior pituitary, first produce ripe ova, follicular and corpus luteum hormones, and these, in turn, produce those vascular and endometrial changes in the uterus known as menstruation.

The primary stimulus is from the anterior pituitary. This gland, which contains but two kinds of secretory cells and which weighs only half a gram, controls the gonads, body growth, the thyroid, the breasts, the adrenals, and also the metabolism of certain substances.²⁶ Its destruction is followed (in part) by complete atrophy of the generative organs.⁹ While it stimulates both the follicles and the corpus luteum it is not certain that it does so through one or through two hormones; nevertheless, perhaps for convenience the literature refers to the folli-

cle-stimulating and the luteinizing hormones of the anterior pituitary.

The hormone developed in the graafian follicle is essentially a growth stimulator. Under its influence¹ the endometrium grows rapidly from the basal layer, reaching a maximum thickness at about the midpoint of the cycle when ovulation occurs. The glands then form a secretion rich in glycogen, and the nuclei are pushed downward to lie at the base of the cells. The glands, growing more rapidly than the stroma in which they lie, comprise relatively more and more of the picture and must arrange themselves in coils to accommodate themselves to the decreasing space. This secretory phase begins at about the fourteenth day of the normal twenty-eight day cycle. It is controlled by the stabilizing influence of the corpus luteum, developed in the site of the ruptured follicle.

Biologically the transition at this midpoint is a tremendous one; there is a definite change in the endometrium and there is a definite change in the state of the uterine muscle tone.⁹ With the establishment of the corpus luteum influence and the secretory phase, the endometrium is ready to receive the fertilized ovum.¹⁹ There is ample nourishment for it in the glycogen-bearing glands until the trophoblast develops and establishes the placental circulation; there is also a quiescent uterine muscle which will not disturb, by undue contractions, the growing mass within its lumen.

Fluhmann¹⁰ emphasizes that without the fertilized ovum there is not only the production of corpus luteum secretion "progesterin," but estrin is formed in greater amounts than ever. "This estrin production causes a progressive inhibition of the anterior lobe, so that the amount of ovary-stimulating hormone available gradually diminishes. Finally, estrin reaches its peak and correspondingly the amount of anterior lobe sex hormone diminishes to a point insufficient to maintain the corpus luteum. This structure undergoes degeneration, which results in a cessation of estrin and progesterin production and thus

a breaking down of the endometrium (menstruation). The absence of estrin now releases the inhibition of the anterior pituitary gland, which again puts out its sex hormone to stimulate the development of a follicle for the next cycle."

Should pregnancy occur, this picture changes. The corpus luteum develops to a larger size and persists for a longer period than it otherwise would, stabilizing the uterus. Why does the presence of a developing ovum change the picture outlined above? The presence of large amounts of estrin at this time should inhibit the activity of the pituitary and insure the same course of events as occurred in the menstrual cycle. The answer apparently is found in the pregnancy urinary hormones.¹⁰

With the menopause there is a cessation of ovarian activity and of uterine response; atrophy of the generative organs occurs, affecting not only the vaginal mucosa but the size of the uterus and ovaries.

The extension of knowledge in regard to hormonal control of the generative apparatus has been accompanied by some confusion. In part this is due to a cyclic arrangement of the events, in the description of which one may begin at any point so long as he ascribes to it no special significance other than its place in a circle whose beginning or end shares the obscurity of any ultimate biological process. In part, also, it is due to the uncertainty regarding the source and nature of the hormones excreted so profusely in the urine of pregnant women and pregnant mares.

The gonad-stimulating, or gonadotropic, hormone (or hormones) of the anterior pituitary has been mentioned, together with that of the graafian follicle and of the corpus luteum. The chief functions of each have been mentioned. Each apparently has an obvious place of origin and an obvious function.

Then it was learned that hormones were excreted in the urine in variable amounts which reached an enormous peak during pregnancy.² Whence, what, and why, were natural questions, and progress towards their answers has added enormously to the literature of endocrinology.

Their origin is probably not, as was first supposed, from the anterior pituitary, though their action resembles that produced by the anterior pituitary. It appears that they arise from the

placenta, the fetal or chorionic portion of which becomes a gland of internal secretion.^{3,6,7,9,10}

Thus we are confronted with the astonishing thought that in pregnancy there is produced in the placenta hormones we had definitely associated with specific, fixed anatomical structures elsewhere in the body. And it is from the urine of pregnant women (or pregnant mares) that practically all of the female endocrine products now marketed are obtained.

In general, the pregnancy urine preparations are estrogenic (producing estrus in spayed rats, as does the follicle hormone) or luteinizing (inducing corpus luteum formation as does the anterior pituitary, in part). Of the estrogenic⁷ variety there are two types, qualitatively similar, and each is similar, if not identical, with the follicular hormone of the ovary. Of the luteinizing variety there is only one. It develops in quantity earlier than the estrogenic type^{3,12} and it is upon the effects produced by this A.P.L. or gonadotropic hormone that the pregnancy tests of Aschheim and Zondek and of Freidman are based.³ The really basic importance of this hormone lies in the fact that it "acts to prolong the life of the corpus luteum, which is then able to further the endometrial changes required by the young embryo."¹⁰

These pregnancy urine hormones may all be isolated from one specimen of urine; Collip, in extracting placenta, found, in the end stage, the estrogenic hormone in the filtrate and the A.P.L. principle in the precipitate.⁶

Common commercial preparations⁴ of the estrogenic principle of pregnancy urine are theelin, theelol, emenin, amniotin, progynon, cestrone, cestriol, folliculin; of the gonadotropic principle there are follutein, prolan, antuitrin "S," and Collip's A.P.L. principle. Since the hormone from the follicular fluid and the estrogenic hormone of pregnancy urine are apparently identical there is no need for the former; whether the gonadotropic principle replaces in the same degree the corpus luteum hormone seems as yet questionable. The actual corpus luteum hormone, named progestin by Corner and Allen, will probably be available soon. One preparation, proluton, has been available, capable of producing, apparently, typical corpus luteum effects.¹⁷ The use of progestin by Krohn¹⁸ and others in the prevention of threatened and ha-

bitual abortion apparently offers satisfactory clinical proof of the function ascribed to corpus luteum activity above.⁸

Most of these urinary products are "methyl derivatives of a four-ringed hydrocarbon, $C_{17}H_{12}$, itself a derivative of phenanthrene, while it is now recognized that cholesterol, ergosterol, calciferol (vitamin D), and other sterols, and all the cholic acids are derivatives of this same four-ringed compound."⁶

The estrogenic potency of these substances has been demonstrated in laboratory animals; to do so in women was more difficult. Kaufmann¹⁷ describes his successful attempts to produce complete menstrual changes in castrated women and in women with primary amenorrhea. Stimulated by the prophecy of Parkes that extremely large doses would be needed, Kaufmann, using one million international units of estrin (theelin), was able to induce the normal endometrial growth. Following this, he induced the changes of the secretory phase by the use of corpus luteum and a typical menstrual flow containing pieces of mucous membrane characteristic of the secretory phase. One million international units of estrin sounds like a very large dose; Kaufmann disposes of this as follows: The chemists, Schwenk and Hildebrandt "showed that hydrogenation converts estrin into a much more active derivative," dehydro-œstrone, which is about four times as active as œstrone (estrin, theelin). One c.c. of this substance contains 250,000 international units, and, instead of speaking of international units, Kaufmann speaks of the physiological dosage, or the amount necessary to produce menstruation in a castrated woman. Along with endometrial changes, Kaufmann produced in several of his patients with primary amenorrhea a considerable change in size of the uterus. The potency of the follicular hormone obtained from pregnancy urine is therefore a well-established fact.

Kaufmann gave his follicular preparation over a period corresponding to the follicular phase of the menstrual cycle. He then gave corpus luteum hormone over a period of five days beginning on the nineteenth day. With the stopping of the corpus luteum, menstruation followed.

It has been for a long time anticipated that excessive development of the endometrium as seen in hypertrophic endometritis was due to an

excessive follicular development and an absence of corpus luteum formation.²¹ Kaufmann simulated such a condition by administering over a period of several weeks some five million international units of estrin. This produced dilated and cystic glands, of which none was convoluted and none contained glycogen. "The characteristic signs of corpus luteum hormone function are therefore absent."¹⁷ The excessive bleeding so often characteristic of hypertrophic endometritis presumably should be controlled clinically by the administration of corpus luteum hormone. That result has been successfully achieved by Kaufmann and a number of other observers, using not only actual corpus luteum preparations but also by the use of A.P.L. preparations (antuitrin "S"), etc., whose luteinizing function produces the same effect as the pure corpus luteum hormone, though probably in different ways (substitution vs. stimulation?).^{14,24}

The experiments of Kaufmann illustrate very clearly the effects of relatively pure follicular and corpus luteum hormones. (It is apparently true that the urinary preparations used by Kaufmann and which are used in this country under the name of theelin, etc., are actually identical with the follicular hormone produced in the ovaries.) The action of the anterior pituitary-like (or A.P.L. products, antuitrin "S," etc.) is less clear. A number of studies have been made upon the effects of the use of this substance. One of the most recent by Hamblen and Ross¹⁴ describes the effect in twenty-four patients of the preoperative administration of A.P.L. (antuitrin "S") upon ovarian tissue. They feel that certain changes are effected which often result in the formation of follicular cysts. In general they feel that the action of these extracts is more typical of the gestational than of the menstrual cycle, and the changes in the ovaries would not differ widely from those of ovaries in pregnancy. Its action is probably not that of a substitute (as in progestin); it appears, rather, to act through its stimulation of corpus luteum activity in the ovary.

Roughly, the cyclic arrangement of the picture is apparent: the anterior pituitary affects the ovary, stimulating it to follicle and to corpus luteum formation; these in turn stimulate certain changes in the uterus. The mechanism for the shifting dominance of each phase, so that any

one may not maintain an ascendancy (as apparently happens in hypertrophic endometritis), is explained as follows: When the level of follicular hormone reaches a certain point, the stimulating action of the anterior pituitary is held in abeyance; as the level falls (following menstruation) the anterior pituitary again becomes active and again stimulates follicle formation. The balance may break pathologically, as we have seen, in the menstrual cycle and produce hypertrophic endometritis; in a like manner, presumably, a break in the gestational cycle will produce abortion and may, apparently, be prevented by the use of corpus luteum preparations. It is of interest to note that Bourne⁵ was unable to induce labor by means of large doses of estrin.

No comparable substitution therapy is available for the anterior pituitary. Any failure or diminution in its productivity may only be overcome by the still uncertain, and perhaps dangerous, method of directly stimulating that gland by x-ray. The only qualification to this statement lies in existence of the A.P.L. products (antuitrin "S" and "G") whose potency and specificity are not of the same degree as are the follicular and corpus luteum products.

Novak and others have emphasized the fact that the present knowledge of hormones in obstetrics and gynecology is far from complete or satisfactory. Hoskins¹⁶ has reviewed a number of "complexity factors," as, for instance, the effect of the hormones on the internal milieu and of the milieu upon the hormones; the complete picture of glandular imbalance as differentiated from a compensated deficit or plethora; the question of the complex equilibrium²⁵ of all glands of internal secretion; and he emphasizes, with others,²⁶ the question of tissue subjectivity to hormones, and suggests that, if refractory, the cause may be found in a vitamin deficiency in the individual. The place of other glands, such as the suprarenal,¹¹ the thyroid,²³ the pancreas and the parathyroids, is receiving a great deal of attention but will not be discussed in this review.

Anspach and Hoffman² indorse the tendency in the literature to question the constancy in relationship between the state of ovarian function and periodicity of flow and the validity of the view that menstrual bleeding depends upon the regression of the corpus luteum. Hartman¹⁵ also objects to this idea of basing the cause of

menstruation on a purely negative phenomenon. Moore²² discusses the uncertainties in our present dosage of hormones and the basis of the threshold of effectiveness. He emphasizes, among others, the fact that the hormone of a given gland does not stimulate itself, but is instead injurious; that the gonads have no power of self-regulation, and emphasizes again that hypophyseal action is modified by the gonadal hormones. In this connection, however, Mazer²⁰ has been able to detect no marked constitutional effects from large doses of estrogenic principles (progynon B or theelin). He did find, however, that in six of seventeen regularly menstruating women it caused a delay of from one to three weeks in the onset and established a new date of menstruation.

The need for a conception of the extensive interrelationship between the glands of internal secretion is apparent in Grumbrecht's¹³ discussion of the elimination of thyrotropic substance in the urine of menopausal women. The permanent release of the inhibiting effects of estrin which occurs at the menopause may result in an excessive stimulation of the thyrotropic function of the anterior pituitary in the same manner in which it releases an excessive amount of follicular hormone. The presence of an excessive amount of follicular hormone, characteristic of the urine of women in the menopause, or of castrates,²⁷ would result in excessive bleeding, so often associated with the onset of the menopause.^{9,20} In a like manner the presence of an excessive amount of the thyrotropic hormone would result in the vasomotor changes occurring in women at the menopause, changes strikingly similar to those produced by increased action of the thyroid.

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THE CLINICAL SIGNIFICANCE OF OVARIAN CYSTS*

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APPROXIMATELY 90 to 95 per cent of all ovarian tumors are cysts. Many of these are derived from the graafian follicle, which is itself a cystic body in its normal state. The point at which it leaves its physiologic size and attains pathologic proportions cannot be definitely stated. Numerous writers have demonstrated cystic follicles in fetuses and in newborn infants. Spivak⁶ found growing and maturing follicles in twenty-nine of a series of thirty-six fetal and young infant ovaries.

The surgeon, in performing laparotomies frequently finds cysts of the ovaries, and the question arises as to their significance and the treatment indicated.

In an attempt to determine what proportion of ovarian tumors, particularly cysts, cause functional abnormalities as shown by changes in the menstrual cycle, a series of case histories from St. Luke's Hospital, together with pathologic findings, has been studied. The material consisted of cases with a diagnosis of some ovarian lesion occurring during the years 1932 to 1934, inclusive.

A total of 186 cases had a diagnosis involving the ovary, with or without other diagnoses. Of these, 169 (90 per cent) were diagnosed cyst, cystic change or corpus luteum cyst, with or without associated lesions. Fourteen (7 per cent) were malignant ovarian tumors, four pseudo-

mucinous cysts, five carcinomas of the ovary, four papillary cystadenomas, and one sarcoma. Eight (4 per cent) were diagnosed parovarian cysts. Four were dermoids. Two each were "multilocular" cysts and chocolate cysts. There was one endometrial cyst, one fibroma and one fibrosis of the ovary.

In thirty-nine cases, more than one type of cyst was mentioned, or the cyst was associated with inflammatory changes in the tubes, ovaries or appendix.

The ages of the patients varied from fifteen years to seventy-seven years, and it was interesting to note that the oldest patient (seventy-seven years) had a benign ovarian cyst, while one of the fifteen year old patients was operated upon for a pseudomucinous cyst weighing 8,100 grams. This patient died of a pulmonary embolus. The greatest number occurred between the ages of twenty and forty years, the years of greatest ovarian activity.

In reviewing the histories of these patients, particular interest was directed only to notes on the menstrual cycle, and the following points were revealed:

1. One hundred and two patients gave a history of regular, normal menses.
2. Seventeen were past the menopause and had noted no bleeding and may therefore be considered normal as to menstrual history.
3. Twenty-one gave a history of regular men-

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ses, but stated that the flow was somewhat more profuse than normal.

Thus, 140 (75 per cent) of these patients gave a history of *regular* menses.

Only forty (21 per cent) of the entire series gave a history of irregular menses. Of these, fourteen had a diagnosis of only "cyst" or "corpus luteum cyst," without any other pelvic diagnosis. The remaining twenty-six with irregular menstrual flow had additional diagnoses such as fibroids, cervical polyps, salpingitis and appendicitis. There were four tubal pregnancies included in this group.

Infection, either of the Fallopian tubes or of the appendix, was the most frequently found complicating diagnosis in the group of patients having irregular and profuse menstrual flowing. It occurred in twenty (50 per cent) of the forty cases.

Thus, in the final analysis, only fourteen cases, or 7 per cent of the entire series of 186 patients, gave a history of irregular menstrual flow which could be attributed only to the cysts of the ovaries: that is, in only fourteen cases was there no complicating factor, such as infection, fibroids, polyps, etc. This is a very small percentage and the question of the significance of ovarian cysts arises.

A great fund of clinical and experimental data has accumulated in the past few years concerning hormonal activity of the female sex glands. The interrelationships of the various female sex hormones have been quite definitely established. We know that the anterior pituitary hormone or hormones control ovarian activity, for in hypophysectomized animals the graafian follicles atrophy.⁵ There is still some argument as to whether the anterior pituitary sex hormone is single or consists of two separate and distinct hormones. Zondek,⁹ in Germany, and Wiesner,⁷ in Edinburgh, are the chief exponents of the theory of duality of the anterior pituitary hormone, calling them Prolan A and B and Rho I and II, respectively, the one being the follicle stimulating and the second the luteinizing hormone. Other investigators, particularly in this country,⁵ believe that only one sex hormone exists in the anterior pituitary body—that in small doses it stimulates ripening of the follicle, while with larger doses luteinization occurs. In either case, it is anterior pituitary prolane which controls ovarian activity. Normally a fine balance exists

between anterior pituitary and ovarian hormones. If an imbalance occurs, menstrual abnormalities result. A relatively frequent type of imbalance is that seen in functional metrorrhagias.³ Functional uterine bleeding is associated with hyperplasia of the endometrium and multiple follicle cysts of the ovary. Zondek,⁹ Wiesner,⁷ and others believe that there is a lack of the luteinizing hormone of anterior pituitary and therefore the follicle stimulating hormone acts without being augmented by the luteinizing hormone, resulting in graafian follicle hypertrophy. The follicles continue to secrete estrin, the follicular hormone, until pressure atrophy destroys the follicle cells. The estrin, acting upon the endometrium, produces hyperplasia with consequent uterine bleeding due to small areas of thrombosis and necrosis.² Thus we have a pituitary dysfunction primarily, consisting of absence of luteinizing hormone, to which the ovarian follicle cystosis is secondary.

However, all ovarian cysts are not found in cases showing this imbalance. It is the multiple follicle cystosis which is associated with cases of functional uterine bleeding. Simple serous cysts of the ovary do not contain granulosa cells, and therefore do not secrete estrin, and therefore bleeding is not found associated with this type of cyst.⁴ Proliferative cysts, such as pseudomucinous cystadenomata, papillary cystadenomata, and dermoids, do not produce estrin, nor do most solid ovarian tumors (carcinoma, fibroma, sarcoma). Granulosa cell activity must be present for the production of estrin. This is found only in follicle cysts and in so-called granulosa cell tumors of the ovary. In pregnancy, ovarian tumors of all types produce ovarian hormone, according to E. Phillip.⁴

In going back to the material of this study—we found that inflammatory lesions such as salpingitis and oöphoritis and appendicitis were associated with irregularities of menstruation in over half²⁶ of the cases showing this irregularity. Inflammation is said to be one of the most frequent causes of menstrual irregularities. This is due to fibrosis about the ovarian follicle,³ preventing rupture and ovulation, so that again the granulosa cells continue to secrete estrin while luteinization does not occur.

A cause of irregular bleeding not brought out by this study, and infrequently mentioned in the literature, is psychic stimulation. We know that

many women, especially young women, will have an irregular menstrual period induced by unusual excitement. This is explained on the basis of a sudden nervous stimulation of the anterior pituitary, which causes a sudden liberation of anterior pituitary sex hormone. This in turn affects the ovarian secretion.⁸ Experiments have been performed in which injections of large doses of anterior pituitary hormone cause ovulation in the rabbit. Normally ovulation occurs only after coitus in the rabbit.

The question arises as to the type of treatment which should be instituted for the ovarian cysts frequently found at operation. Large isolated cysts should be excised, leaving as much functioning ovarian tissue as possible. If menstrual irregularities have occurred, operative treatment should be followed by hormone therapy of the proper type. The smaller multiple cysts may safely be punctured at operation, and here again hormone therapy should be instituted if the cysts are numerous or have produced symptoms. The older practice of resecting a portion of an ovary showing diffuse follicle cystosis is in most cases not advisable, since the underlying cause is not affected, and the ovary is left scarred. Hormone therapy should give the best results in these cases. When inflammatory changes are found these should be treated as conservatively as possible, in many cases post-operative heat treatment being very beneficial.

In addition to hormone therapy, stimulating doses of x-ray to the pituitary and ovary have been found beneficial in certain of the functional metrorrhagias and amenorrheas. Drips and Ford¹ have given this type of therapy a thorough trial, as have others. Additional measures which must not be overlooked in treating menstrual disturbances are improvement in the general hygiene, high vitamin diets, desiccated thyroid at times and calcium and iron administration.

Theoretically the old treatment of bimanual

palpation and rupture of a single ovarian cyst found on pelvic examination would be good treatment if followed by other measures, and if the diagnosis could be definitely established. But occasionally serious error might result and malignancy or other complications be overlooked.

Summary

1. Data on 186 patients with various ovarian lesions are presented.
2. Ninety per cent showed simple cysts or "cystic change."
3. One hundred and forty (75 per cent) gave a history of regular menstrual cycles.
4. Forty (21 per cent) gave a history of irregular menstrual flow. Only fourteen (7 per cent) of these had uncomplicated cysts.
5. Inflammation of the tubes, ovaries, or appendix was the most frequent complicating lesion in women having irregular menses.
6. The present conception of the pathologic physiology underlying functional uterine bleeding is that a lack of the luteinizing hormone of the anterior pituitary exists. This allows the follicular hormone to act without the luteinizing hormone, and the endometrial hyperplasia so induced results in hemorrhage.
7. Various methods of treatment of ovarian cysts and functional uterine bleeding are mentioned.

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SURGERY IN CHRONIC SINUS DISEASE

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I.

PROGRESS in the field of rhinology is keeping pace with the advance in other medical arts and sciences. In the surgical management of chronic sinus disease of marked degree, the criticism by contemporary surgeons is diminishing against the operation known as the external fronto-ethmo-sphenoidectomy. Many rhinologists have reversed their adverse opinions after having observed the patient undergoing this particular operation or after examining one who had been previously operated in this manner.

In many sections of the country one may still witness an extensive intranasal procedure in which the operative field is obscured by blood; the curet and punch guided not by the eye but by imaginary lines projected on the patient's face. The postoperative course, too, is often stormy and sometimes fatal. Last, but far from least, the after-care is sometimes prolonged and extended. This is true if the operator could not be as thorough as he had intended because of hemorrhage, inaccessible periorbital ethmoid cells, or an unusual sphenoid formation. In an attempt to hasten retarded progress the proposal is made of another operation, or even a third or fourth! All of this might have been accomplished originally. Later, if the patient should become discouraged or the doctor disheartened, one is likely to find a "conglomerate mass of hypertrophied and scarred mucosa, fibrous tissue and bone bathed in pus and carpeted by crusts," using the oft repeated words of the late Ross Skillern. If such results were to be considered end-results it is little wonder that family physician or internist is either unwilling to permit or unlikely to agree to such operative procedure.

The general practitioner has not alone shared these views. Many rhinologists throughout the country have been well aware of what their colleagues disapproved. They have been fully cognizant that in early chronic infection of the sinuses involving one circumscribed area a well chosen intranasal procedure with well planned general management would effect a cure.

It is not to these simple cases that I refer, but to those where the infection extends into adjacent sinuses and has become definitely chronic. It is in this large group of patients that results have been neither satisfactory to the patient nor to his doctor. The infection has not only produced marked disease within the sinuses but obvious intranasal changes are in evidence. The nose has essentially ceased in its normal function and instead has become a source of constant trouble to its possessor.

One method of management, medical or surgical, is not a cure-all for any stage or every stage of infection. One should adopt a sensible point of view and employ a procedure suitable and completely adequate to the patient and the existing pathology. The patient should not be subjected to any single type of treatment. Obviously it would be ridiculous to advise a complete and thorough exenteration of all sinuses when only the anterior ethmoidal labyrinth is at fault or even if the patient had recovered from one or two attacks of an acute frontal sinusitis due to enlarged bullar and agger-nasi cells which obstructed the frontonasal duct. By the same token, it would be absurd to advise a conservative intranasal procedure to be used in the hope of curing one who presented an extensive and marked involvement in the frontal, ethmoidal, and sphenoidal sinuses with the middle turbinate greatly hypertrophied and void of function.

I feel the criterion of good judgment can only be gained by a careful estimation of all factors. By all factors I mean a careful history, a complete clinical and laboratory survey, a roentgen-ray, preferably with radio-opaque contrasting media. Then and only then can one determine the most expedient procedure to advise on that particular patient.

It is for the patient with signs and symptoms of pansinusitis of long standing that notable advances in surgery have been made. There is accomplished in this one procedure what formerly required from two to often four or five operations. With this newer method a clinical

cure in many cases and always marked relief in others can be promised to the patient.

It does not seem out of place to briefly outline the technic used in this so-called procedure,

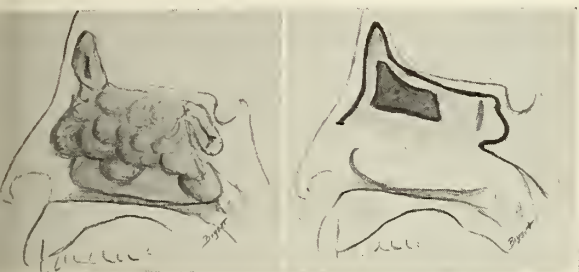


Fig. 1 (left). Lateral nasal wall (adult) showing marked changes in frontal, ethmoidal and sphenoidal sinuses and polypoid degeneration of middle turbinate.

Fig. 2 (right). Lateral nasal wall (adult) showing operated area (bounded by heavy black line). The frontal, ethmoidal and sphenoidal sinuses have been created into a common cavity. Inner rectangular darker area is removed portion of lamina papyracea revealing orbital contents.

viz: an incision similar to that made for a dacryocystectomy is all that is needed for the usual case. By dissection from the line of incision the lamina papyracea is brought into view, the posterior ethmoidal artery is exposed and then put on tension by self-retaining retractors. The artery is ligated with suitable instruments. This in itself is the main factor in permitting a subsequent thorough procedure. Breaking through the lamina papyracea, the entire ethmoidal labyrinth and non-functioning diseased middle turbinate may be removed. The floor of the frontal sinuses and agger-nasi cells are next removed. A splendid view of the entire anterior wall of the sphenoid is then seen. With appropriate punch forceps this wall is removed and, if need be, the spheno-palatine artery is ligated. The curet has no place in this operation; a complete exenteration is accomplished by guarded biting and punch forceps. Picric acid-acetone solution on small gauze balls is used to perfect the toilet of the operative cavity rather than cureting and inadvertently breaking down the protective osteitis present in the bony walls. The entire operation can be easily viewed and the instruments are under control of the surgeon.

This procedure results in minimal postoperative care and hospitalization and in from two to six weeks only a slight linear scar can be detected. This technic is the operation known as the "external fronto-ethmo-sphenoidectomy," advocated by the late Robert Lynch, Sewall, Ferris

Smith and others. True, the operation is somewhat more time-consuming than the intranasal route, but I firmly believe it is better to spend the required time in the operating room in the

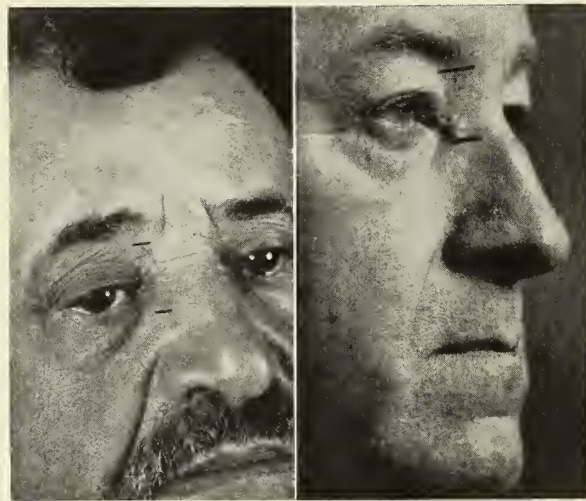


Fig. 3 (left): Unretouched photograph of a patient one month after external fronto-ethmoid operation. The horizontal ink lines show extent of original incision.

Fig. 4 (right). Unretouched photograph of a patient five weeks after external fronto-ethmoid operation. The horizontal ink lines show extent of original incision.

ligation of crucial blood vessels to permit complete exenteration under direct vision. The intranasal radical operation, if it were to be done completely, would endanger the life of the patient, and by this fact it would obviate completeness.

Completion of forty operations without fatality or complication constitutes evidence of its safety as contrasted to endeavoring to duplicate this procedure entirely by the endonasal route. Minimal postoperative reaction bespeaks its comparative freedom from surgical trauma. The little postoperative care and rapid healing indicates it is a satisfactory method of dealing with chronic sinus infection.

II.*

The second part of this paper consists of a report of a group of twenty-eight external fronto-ethmo-sphenoidal operations which were done this past year on the Otorhinology service of the University of Minnesota.

No attempt at this time will be made to review the literature or to give the operative tech-

*From the Department of Otolaryngology, University of Minnesota Medical School. Part II of this paper was presented before the Minnesota Academy of Ophthalmology and Otolaryngology in December, 1935.

nic excepting to state that the general plan suggested by Lynch, Sewall and Ferris Smith was followed. In this clinic four stages or grades of chronic sinus infection are recognized. Patients who showed a third or fourth degree involvement, or who had failed to obtain desired or adequate relief from previous treatment and intranasal procedures were advised to have this operation.

In the non-allergic group of fifteen, six of whom had bilateral involvement, the most common persistent complaint was that of purulent discharge. The next, nasal obstruction. Usually it was almost complete and not influenced by intranasal medications. In five it had returned after intranasal operation. Headache was a variable complaint. It was usually present when the patient had an acute flare-up or a prolonged head cold. In one patient the headache assumed such proportions as to provoke suicidal intent and especially when morphia gave no relief. In the allergic group of four, three of whom had bilateral involvement, asthma was the outstanding symptom. Each patient presented both allergic and infective changes in the nose. All patients were observed at intervals so that a true estimate of the extent of their disease could be made.

All patients had complete laboratory and x-ray studies as well as physical examination before this type of operation was done. No patient was operated upon who had a temperature of more than 99.6 or who had had an acute flare-up within the previous two weeks. The group of twenty-eight operations would obviously have been larger if this restriction had not been made but it was felt that this type of operation should not be done with an immediate history of an acute exacerbation.

Preoperative.—A barbiturate was given the night before and the morning of operation. Pantopon gr. $\frac{1}{3}$ was also given by hypodermic the morning of the operation. The nose was packed from two to three times with 2 per cent pantocain and 1-1000 adrenalin in the ratio 2:1. Both the sphenopalatine ganglia through the anterior palatine canal and the periorbital tissues were injected with 1 per cent novocaine. The patients were operated upon in the erect position.

Pathology.—Our findings at operation were usually more extensive than was indicated by

the x-ray report. This was especially true in the periorbital ethmoid cells. Histologic studies showed extensive leukocytic infiltration and fibrosis.

Postoperative.—The patient was instructed not to blow the nose or use the eyes for reading for at least three weeks. On the fourth to the sixth day suction cleansing of the mucus and blood serum coagulum, et cetera, was made. An occasional sterile saline irrigation of the nose was used but not routinely.

Results.—There were no deaths. There were no complications. There was no postoperative hemorrhage either immediate or delayed. One patient had an epistaxis on the seventh day which brought her back to hospital. She had had two previous intranasal operations each with apparently a postoperative hemorrhage which required packing, and was apprehensive about a third. This epistaxis yielded promptly to adrenalin-soaked cotton.

Temperature.—Only one patient showed a postoperative febrile reaction of 101, which was recorded but one time after each of his two operations. The other temperatures ranged from normal to 100.3, rectal readings.

Pain.—Codeine usually was sufficient. Morphia was occasionally given.

Dressing.—A simple head dressing with the eye covered for two or three days sufficed.

Epiphora.—This varied from seven to twenty-eight days.

Diplopia.—Three patients had diplopia for from one to two months. These occurred in our first patients. It was found upon rechecking that they had been allowed to read too soon after the dressings had been removed. With definite restrictions and supervision most patients had very transient diplopia if any at all.

End Results.—The patient with the headache of severe proportion has been relieved (a year has elapsed since her operation). Those with purulent discharge and nasal obstruction were, with the exception of two patients, markedly improved to clinically cured in at least seven. One who complained of frontal headache and purulent discharge had bilateral involvement; he has the other side yet to be operated upon. The other patient who originally complained of recurring polyps, complete nasal obstruction, and headaches has gained relief from the first two complaints but still has periodic headaches. This

is probably due to too conservative handling of the sphenoids. She was the first patient of this series. There has been less frequency of head colds. However, sufficient time has not passed to give final judgment. After periods ranging from two to eight months intranasal inspection revealed a smooth modified mucous membrane covering the operated area. This was free from crusting, purulent discharge or granulation tissue.

In the allergic group there were but four patients. Two of these had had asthma but had had none since their last surgical procedure. One continues to have asthma during and fol-

lowing head colds. She is also sensitive to numerous foods. The fourth is much improved; a bilateral Caldwell-Luc operation is yet to be done on this patient.

The hospitalization averaged from five to six days; some were discharged on the fourth day; one patient was in for a duration of sixteen days.

I am satisfied that this is a most acceptable method after both observing and using various intranasal procedures for chronic sinus infection of marked degree. Robert Lynch commended it to his colleagues when he participated in the symposium on the ethmoid problem. I heartily subscribe to his recommendation.

PRIMARY OPERATION FOR SUPPURATION OF THE PETROUS PYRAMID*

Report of Two Cases

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IN THE literature on the surgical treatment of suppuration of the petrous pyramid, it appears that the curative operation has been secondary because the condition may not have been recognized primarily. As a result of recent stimulation of interest and the voluminous literature on the condition, otologists are now better able to recognize the condition primarily. It seems obvious that a primary operation has great advantage over a secondary operation. The following two cases are illustrative of diagnostic criteria and the results that can be obtained by recognition of pathologic changes in the pyramid and well directed surgical management.

Report of Cases

Case 1.—The first patient, a girl aged twelve years, had had an earache on the right side of five weeks' duration. There was no history of previous upper respiratory infection. She had previously been brought to the clinic at the age of two and a half years when she had had acute mastoiditis on the right. This had cleared up under treatment. Prior to this second visit she had had earache and fever for about a week, when a local physician had been called. He had immediately performed myringotomy on the right. There had been profuse discharge from the ear, which was still draining at the time of the patient's second admission. For four weeks the patient had then had intermittent pain

deep back of the right eye; this pain had become continuous and had been much more severe four days before admission. With the start of this deep post-ocular pain, ptosis of the right lid had developed which had remained constant. Diplopia had also been present, and intermittent vomiting of projectile type had occurred in this period of four weeks. In the last two or three days before admission the patient had noticed some rigidity of the neck.

Examination of the ears, nose, and throat otherwise gave negative results, the right sphenoid, especially, being found clinically to be uninvolved. There was a pulsating discharge from the right ear, but no mastoid tenderness could be elicited, except posteriorly in the region of the mastoid emissary vein, where a very slight tenderness could be elicited on firm pressure. A stapes fixation type of deafness was present on the right side.

Examination of the eyes revealed the fundi to be essentially negative except for mild venous engorgement. There was a mild glial excess of the upper nasal disk margins, slightly more marked on the left. The patient read fine print with the left eye, and with the right also with the aid of a sphere of +5 diopters. The right pupil was larger than the left and was fixed. The reflexes were absent on the right and normal on the left. The visual fields were normal. Complete paralysis of the right third nerve was present, with ptosis, iridoplegia, and cycloplegia. The function of the sixth cranial nerve was apparently normal on both sides. Nystagmus was not present.

Neurologic examination gave negative results except for indicating slight rigidity of the neck and a positive Kernig sign. On puncture, the pressure of the spinal fluid was 27 cm. of water. The spinal fluid was the

*From the Section on Otolaryngology and Rhinology, The Mayo Clinic, Rochester, Minnesota. Read before the Minnesota Academy of Ophthalmology and Otolaryngology, St. Paul, Minnesota, January 10, 1936.

color of ground glass and was turbid, grade +2. No organisms were found on smear, and there was no growth of organisms or culture in brain broth, blood agar, or chocolate blood agar in twelve hours. There

in the fluid; the fluid was under normal pressure and had a normal appearance. There was slight residual of the paralysis of the third nerve, mostly affecting the power of accommodation. The patient was advised



Fig. 1 (Case 1). The lines of advance of the perilabyrinthine cells may be clearly seen. This is the first case reported in the literature in which the cell line over the labyrinth has been followed.

were 1,216 small lymphocytes and 1,600 polymorphonuclear leukocytes per cubic centimeter of fluid.

General physical examination gave essentially negative results. A roentgenogram of the sinuses was reported negative; that of the mastoid process on the left was also reported negative, and that of the mastoid on the right was reported as diffusely cloudy, indicating destruction of the cells over the lateral sinus.

A diagnosis was made of dural irritation secondary to petrositis, and because the smear and culture of the spinal fluid were negative, exploration of the mastoid and petrous pyramid was advised. At operation, the cortex was found to be like ivory and was extremely thick, but, in the region of the antrum, a cavity was found which was about 1.5 cm. in diameter and was filled with pus under pressure. A small parasinous abscess was found midway between the upper and the lower turn. The dura of the middle fossa was uncovered and was found to be normal in appearance. On examination for extensions into the petrous pyramid, a line of cells containing infected granulations was found leading above the capsule of the labyrinth (Fig. 1). The cells were scooped out with a fine curet until firm bone was found at a depth of 1.5 cm., approximately at the medial aspect of the labyrinthine capsule. A similar line of cells was found in the sublabrynthine region and was followed in to approximately the same depth.

The following morning the headache had completely disappeared and the ptosis was less marked. The patient was dismissed in fifteen days with the postauricular wound completely healed. Spinal puncture three days before dismissal revealed fifty-nine small lymphocytes

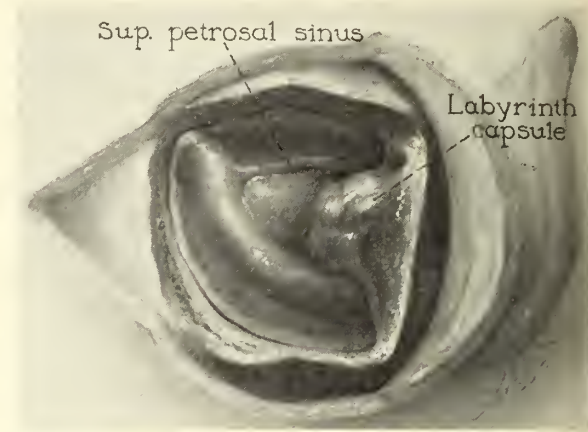


Fig. 2 (Case 2). In this case the labyrinthine capsule was nearly dissected free.

to have the ocular fundi checked once a month for the next two months.

Case 2.—The second patient, a girl aged eleven years, five weeks before admission to the clinic had had an attack diagnosed as influenza, with sore throat and fever. She had been confined to her home for a week and had then returned to school. A week later she had complained of pain in the right ear; during the night, the ear drum had ruptured spontaneously and the ear had discharged. The patient had continued to have pain about the right mastoid region for about two weeks. She had begun to have attacks of vomiting once or twice a day about a week after the onset of the earache, and these attacks had continued up to the time of her admission. About two weeks after the onset of the earache the patient had begun to complain of pain, deep back of the right eye and in the right frontal region; almost immediately she had had diplopia and photophobia, which were still present at the time of admission. The patient had been free of fever for a week prior to her admission. During the course of the illness she had lost 19 pounds (8.6 kg.).

On admission, there was a thick profuse discharge from the right canal, with marked drooping of the postsuperior wall and concentric narrowing of the external auditory canal medial to the isthmus. No mastoid tenderness could be elicited. There was no evidence of sinusitis, particularly involvement of the right sphenoid.

Examination of the eyes (vision, reflexes, and pupils) gave negative results. Examination of the fundi showed blurring, of about 1 diopter, at the upper and lower margins of the disks, being a little more marked on the left. Paralysis of the right external rectus muscle, graded 2, was found, with homonymous diplopia to the right. Neurologic examination gave evidence of

slight stiffness of the neck and a slightly positive Kernig sign.

Roentgenograms of the sinuses were negative, but a roentgenogram of the skull showed marked cloudiness of the right mastoid. Spinal puncture was performed, and the fluid was found to be clear and to be under a pressure of 13.5 cm. of water; it contained one lymphocyte per cubic millimeter. Smears and cultures of the spinal fluid were negative for organisms. A diagnosis of mastoiditis, with probable epidural abscess, Gradenigo's syndrome, and possible petrositis, was made.

On uncovering the mastoid, it was found that the petrosquamous suture ran very far posteriorly, ending posterior to the tip of the mastoid. The larger part of the mastoid was therefore developed in the squama; it was of the diploic type and was not involved by the disease. On removing the petrosquamous lamina, however, it was found that the petrous portion of the mastoid was much broken down and a large epidural abscess was present. This abscess extended from a point on the lateral sinus about 2 cm. posterior to the upper knee, to the turn of the sigmoid toward the jugular bulb below, and then extended for about 3 cm. over the temporal lobe to the zygomatic root. The petrous portion of the mastoid was removed down to the labyrinthine capsule, about 1.5 cm. of the superior petrosal sinus being uncovered (Fig. 2). A group of cells which extended along the posterosuperior aspect of the labyrinthine capsule to approximately its medial border were exenterated; they seemed to terminate here without advancing to the apex. The wall of the sigmoid sinus was much thickened but on emptying the vein it refilled normally, both from above and below, so it was not opened. The wound was closed in the usual manner.

The patient's headache had disappeared on the following day, and paralysis of the abducens nerve had nearly disappeared. She was dismissed in two weeks, and the ear drum and postauricular wound were completely healed, the abducens nerve was functioning normally, and the fundi were normal.

It is of interest that in the first case sclerosis of the cortex produced by previous mastoid disease was present, whereas in the second case an anomalous condition in which there was a thick petrosquamous lamina may have been the factor that favored deep progression of the disease. This is the first example I have seen of the tip of the mastoid being formed by the squama.

Comment

The first observation on suppuration of the petrous pyramid was made by Bärckner in 1883. Muck in 1900 reported the first operative cure by the procedure of following fistulous tracts on the anterior and posterior aspects of the labyrinthine capsule. Goris in 1903 explored the petrous

apex by the subdural route and removed a large sequestrum of the apex. Moure, a year later, followed a fistulous tract behind the labyrinthine capsule and also secured a cure. Combier, in 1909, reported a cure secured in the same manner, as did Levesque in 1912. Holmgren in 1922 secured recovery by draining the apex after performing labyrinthectomy. O. Mayer reported a cure by following a fistulous tract above the eustachian tube after exploration by the subdural route had been ineffective.

In 1931 Kopetzky and Almour reported the cure of four of eight patients who were operated on by his technic. His paper was epochal in that it produced marked stimulation of interest in petrositis in this country, and since that time the number of reports on the condition has shown a very marked increase. This paper was the first in this country to suggest that a definite syndrome, which made early recognition possible, accompanied the lesion, and that surgical attack offered more than a forlorn hope. Kopetzky deserves the greater credit in that he was apparently unaware of the pioneer work of the French surgeons and based his work on reports at necropsy and anatomic descriptions in the German literature, which were extremely incomplete.

The fundamental anatomic investigations were carried out in 1904 and in 1906 by Mouret and Lafitte-Dupont in their researches on the cellular structure of the petrous pyramid, although Urbantschitsch had noted peritubal cells leading to the apex as early as 1890. These investigations were followed in 1908 by Baldenweck's remarkable thesis for his doctorate in medicine. He organized the clinical and anatomic observations made up to that time, suggested the proper diagnostic criteria and surgical attack, and produced almost by his unaided efforts an article superior, especially in his surgical recommendations, to any published even up to the present time.

Baldenweck defined the petrous apex as that part of the pyramid medial to the labyrinthine capsule, and we accept this definition in our discussion. He described the petrous apex grossly as made up of three types: the cellular, the diploic, and the sclerotic, or of any combination of the three. He described its gross appearance as a hard central core surrounded by finer bony trabeculae fanning out to the cortex. Following

Mouret and Lafitte-Dupont, he described the six lines of cells which might invade the petrous apex around the periphery of the labyrinthine capsule. He expanded knowledge of the relation of the petrosphenoidal ligament to the abducens nerve in forming Dorello's canal, and he noted the close relationship of the gasserian ganglion and the carotid and cavernous sinus to the petrous apex. He also called attention to the relationship of the oculomotor nerve to the carotid artery, that of the base of the petrous pyramid to the vault of the nasopharynx, and that of the canaliculus hiatus subarcuatus to the posterior avenues of perilabyrinthine cells. He also mentioned the possible rôle played by the greater superficial petrosal nerve in producing the pain of petrositis.

The symptoms of disease of the petrous pyramid do not depend on disease of the bone itself but on irritation and invasion of certain contiguous structures, as has been demonstrated at the clinic by two cases of symptomless petrositis discovered in the course of complete (simple) mastoidectomy.

The structures most frequently involved in disease of the petrous apex are the gasserian ganglion and the superficial petrosal nerve. Eagleton has demonstrated that the first division of the fifth cranial nerve is bound by fibrous bands to the underlying dura and bone, and he was of the opinion that it is this factor that produces the deep retro-ocular pain often seen in the condition. Pain in the second and third divisions of this nerve has also been noted in connection with petrositis, and trismus associated with irritation of the motor root has likewise been noted. Vail maintained that retro-ocular pain is caused solely by irritation of the greater superficial petrosal nerve in its course along the anterior surface of the petrous pyramid. I have observed a case in which retro-ocular pain was the only symptom present, with anesthesia and ulceration of the cornea; Brunner has said that corneal anesthesia is characteristic of petrositis, so it seems probable that vidian irritation is a factor in the production of pain. The recurrent nerve of Arnold, a branch of the ophthalmic nerve supplying the dura of the region, has also been implicated. It would probably be a more logical position if one would assume that any of these structures, when irritated, could produce the

symptom which, according to Kopetzky, is characteristic of the disease. That deep retro-ocular pain is not an invariable symptom is shown by Ramadier; this symptom occurred in only thirty-two of fifty-seven cases reviewed by him. However, as Ramadier remarked, some type of referred pain is the most frequent symptom of petrositis.

The symptom second in importance is paralysis of cranial nerves. Paralysis of the abducens nerve is the most constant, and Baldenweck was of the opinion that while toxic neuritis, or the localized dural irritation of Gradenigo, may in some instances be responsible, the most common cause is suppuration of the petrous apex. Baldenweck also noted the occasional association of paralysis of the oculomotor nerve with petrositis, and Atkinson thought it was the result of a generalized swelling in the region, pressing the nerve against the carotid artery. Paresis of the facial nerve has also been noted in association with petrositis, but not as often as might be expected because of the position of the nerve in the center of the pyramid. This resistance may be attributable to the hard, bony facial canal and the good blood supply from the auditory artery.

An abscess pointing in the vault of the nasopharynx may be the only sign of petrositis in diseases of the sublabrynthine line of cells, and it is indicative of involvement of the inferior portion of the pyramid. Baldenweck was of the opinion that cavernous sinus thrombosis in association with mastoid disease was usually caused by suppuration of the petrous apex.

Signs of meningeal irritation are common in association with petrosal suppuration, and an eventually fatal outcome is usually ushered in with explosion of a suppurative meningitis. Examination of the spinal fluid should always be done when petrositis is suspected. Even if large numbers of polymorphonuclear leukocytes are found, if the smear and culture of the fluid are negative, serous meningitis may be assumed and operative intervention may be successful. The diagnostic symptom of least value is a temperature indicating a septic course, and, while the temperature is sometimes elevated, it may be normal until the start of meningitis or cavernous sinus thrombosis.

The symptoms of petrositis may appear at any time during the course of the disease, sometimes

as one of the initial symptoms, occasionally not until several weeks after apparently complete mastoidectomy.

In regard to evaluation of symptoms and the proper procedure to adopt, Baldenweck said:

"In our opinion, if one is correct in suspecting an osteitis of the petrous pyramid, one may think of it as possible or probable, but certainty can never be actually acquired. It is possible if one of the following symptoms appears: paralysis of the iii and especially of the vi, and signs of serious irritation of the trigeminal. It is probable if these signs are associated with one another, to a peripharyngeal collection, to deep pains, or to signs of retention of pus. The appearance of a thrombosis of the cavernous sinus may lead to confusion because of the paralyses which it may cause, but may itself be due to an osteitis of the petrous apex. When and how should one intervene? The wisest course appears to us not to carry to a conclusion an intervention against the petrous apex but to operate in two stages. On the first occasion, one should make a very large radical; one should follow the lesions, if they are there, as far as possible; one should uncover systematically and to a sufficient extent the elbow of the lateral sinus and the dura mater in the region of the tegmen. If definite lesions lead up to the apex one should follow them while taking care not to injure the carotid, the vii and the cavernous sinus. It is better not to open the dura mater, which appears difficult to us because it is often adherent and softened. If the radical and the different explorations mentioned remain without result; if free drainage has not been assured; if the symptoms persist, one would be authorized before the explosion of meningeal or cerebral complications to uncover the apex (by the subdural route)."

This advice, with some technical modifications, is that followed at the clinic, and it was worked out independently before we had the privilege of reading Baldenweck's paper.

Eagleton in 1930 advised a procedure which he characterized as "unlocking the petrous apex" in which, after doing a wide decompression by removing the bone about the zygomatic root, and the bone over the sigmoid (the anterior and posterior buttresses) together with the bone over the temporal fossa, he elevated the temporal lobe and opened the apex with a hook. In cases in which serous or suppurative meningitis was present, he advised incision of the dura and drainage of the basal cisterns. I cannot agree that opening the dura, especially when a serous meningitis is present, is good surgical practice, although the exposure of the field in Eagleton's approach is excellent, especially if combined with ventricular drainage. The latter, I think, is con-

traindicated if there is any possibility that organisms are present in the cerebrospinal fluid. Later in the same year Kopetzky published a report of his technic in which, after radical mastoidectomy, he introduced a burr in the region of the zygomatic root and advanced it into the petrous pyramid between the carotid artery, the cochlea, and the surface of the pyramid with its dural covering. Myerson, Rubin, and Gilbert pointed out the danger of this surgical approach and suggested a subdural approach, with removal of the wall of the petrous pyramid just beyond the labyrinthine capsule. Ramadier suggested an approach to the petrous pyramid beneath the knee of the carotid artery, after flattening out the tympanic bone and exposing the ascending limb of the carotid artery. This approach is somewhat similar to Kopetzky's, but proceeds according to correct surgical principles.

In a paper published in 1932, Lillie and I advised following the diseased cellular tracts in their course around the labyrinthine capsule. It is our opinion that radical mastoidectomy is rarely necessary, as even when one of the fistulous tracts enters the pyramid by way of the hypotympanum or pericarotid region, other tracts will probably be present by which the infected pyramid can be drained. If sufficient drainage cannot be secured in this manner, after a sufficient interval we believe the petrous pyramid should be drained, after the manner of Eagleton or Ramadier.

In following this procedure we have had but two deaths in seventeen cases of petrositis: one of a patient who had cavernous sinus thrombosis at the time of his admission to the clinic; the other of a patient with severe diabetes who died of pneumonia (type II pneumonococci) although a pure culture of hemolytic streptococci had been secured from the mastoid.

We therefore feel that this relatively conservative procedure in cases of petrositis will secure the best results.

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DIAGNOSIS AND TREATMENT OF ACUTE INTESTINAL OBSTRUCTION

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IT IS fortunate that most conditions we are called upon to treat do not demand an immediate diagnosis. However, there are a few conditions in which early diagnosis is of the greatest importance and one of these is acute intestinal obstruction. In private practice we do not see a case very often and very few during an entire lifetime; consequently, when confronted with a case we lack the experience and may not be prepared to treat it properly.

I have nothing new to offer on this subject, but I think it is advisable for us all to exchange our experiences and benefit from each other's success or failure. There has been a great deal written on this subject the last few years, both on clinical and experimental investigation. We are indebted to Dr. Wangenstein of the University of Minnesota for the valuable work he has contributed to this subject. His device for relieving gastric distress and distension by the duodenal suction tube is a godsend to every patient suffering from this complication following operation or in paralytic ileus.

The discussion of this subject is based on information gained from a study of literature and from clinical observation.

Mortality.—Deaver¹ placed the mortality in intestinal obstruction at 50 per cent. Miller⁵ of New Orleans reported 209 deaths in 343 surgical cases, a mortality of 60 per cent. Fey and Cubbins³ report an analysis of 241 cases at Cook County Hospital, from 1921 to 1931, with 103 deaths or 42.7 per cent mortality.

Causes.—Moore estimates that 65 to 70 per cent of intestinal obstruction is due to paralytic or dynamic causes. Strangulated hernia, post-operative adhesions and bands, and intussusception contribute mechanical causes. Peritonitis is responsible for certain cases.

Symptoms and Diagnosis.—Sudden, severe abdominal pain is the first and important symptom. At first the pain is paroxysmal and later continuous. It is the red flag of danger and if this signal is knocked down by giving morphine before diagnosis is made, the patient will rest in false security and mislead the doctor.

Deaver once said, "Not to give morphine after diagnosis is made is inhuman, but to give before the patient has been carefully examined from every angle is unpardonable." He modifies this statement by saying it may be advisable to give one dose.

The history of previous operations, especially that for a perforated appendix, is very helpful in making a diagnosis.

Obstruction due to intussusception differs from other forms in that it generally occurs in children under two years and is very rare in an adult. The cardinal symptoms and signs are sudden, severe pain in the abdomen, vomiting, very rapid exhaustion, bloody mucus, and later the development of a tumor in the abdomen, usually on the right side but which may extend across to the left side.

Patients with a complete obstruction from the beginning are not difficult to diagnose. Be-

cause of the continuous pain they will demand relief and unless this is done by morphine it must be done by surgery.

Nausea and vomiting are always present at the onset, but if nothing is taken by mouth it may be absent after the initial attack until the late stage.

The fact that the bowels have not moved and no result is obtained by an enema is generally considered a sign of acute obstruction. Therefore, a bowel movement prior to or immediately after the onset of symptoms might lead one to believe obstruction was not present.

Wangensteen has shown in experiment on dogs that the bowel may evacuate itself below the obstruction after an enema. He has made the same clinical observation.

Abdominal distention is always present but may be absent at the onset; therefore, its absence in the early stage might be misleading.

Increased peristalsis is always present in mechanical obstruction, but it is not present in paralytic ileus. Its presence may be indicated by gurgling sounds heard on auscultation. In high obstruction it may be heard only in the upper abdomen. If the peristaltic sounds are diminished or absent, this is regarded as evidence that a severe injury to the bowel has taken place. Personally, I have found that this is not always a correct conclusion.

Rigidity and tenderness are usually present, but not definitely localized.

Dehydration and hypochloremia are always present in obstruction, depending in degree upon how much the patient has vomited. Wangenstein and Chunn⁸ reported a case in which there was a loss of 6,000 c.c. of fluid in twenty-four hours. Life cannot exist without chlorides. Dr. Primrose of the University of Toronto has said that if the blood chlorides fall below 450 mgm. per 100 c.c., peristalsis is inhibited. With the reduction of chlorides there is an increase of non-protein nitrogen. It has been shown by experiments that the higher the obstruction the greater is this imbalance of the blood chemistry and the more serious the prognosis. That absorption of toxin is not the only factor is shown by the fact that the lower the obstruction, in which case there is more area for absorption, the less serious the symptoms.

There is very little rise in temperature and

pulse to help in making a diagnosis until later in the course, when a fatal termination is approached.

There may be an increase in the leukocyte count in obstruction, but this is not to be depended upon in making a diagnosis.

X-ray.—X-ray is a valuable aid in diagnosis. The film should be made without giving patient any barium, and if gas is found in the small intestine, it is an indication that obstruction is present. If the obstruction is high in the jejunum, barium may be given by mouth in order to determine the location and confirm the diagnosis. This was done in one case and a brief history of this case will be given later. Obstruction cannot be excluded even though no gas is seen in the small bowel on the x-ray film.

Treatment.—Operation is the only treatment for obstruction and the earlier this is done the better is the prognosis. However, of more importance than early operation is the preparation of the patient to overcome dehydration and hypochloremia. This should be done by the administration of 10 per cent glucose in normal saline solution, intravenously. If the chlorides are very low the strength of the saline may be increased or it may be given interstitially or per rectum. The glucose, by its diuretic action, will aid in the reduction of non-protein nitrogen and will furnish energy.

To rush the patient to the operating room without proper preparation is bad surgery. A few hours delay required to give saline and glucose solution and emptying the stomach by lavage or nasal suction is of greatest importance.

The duodenal suction tube gives such wonderful relief in postoperative distention and in a suspected case of obstruction that it might be misleading when obstruction is present. I have had this experience in two cases.

I have used both local and general anesthesia, but I have never used spinal anesthesia in these cases.

The object of operation is to relieve the obstruction. The question may arise, "How should it be done and how extensive an operation should be done?" This depends upon the condition of the patient. If the patient is seriously ill, an enterostomy is recommended; that is, a tube is introduced into the proximal distended

bowel. This was first used by Bonney, in 1916, and later modified by C. H. Mayo by bringing the tube through a piece of omentum. This might be done when there is a large section of bowel involved even if the obstruction is relieved. There are those who doubt the value of the enterostomy tube. Orr and Harden published a paper in 1929 after reviewing the literature on clinical experience and experiment and concluded "that it is of no value when there is a general peritonitis with fluid. In selected case of peritonitis of the lower abdomen, enterostomy is life-saving."

The postoperative treatment is just as important as the preoperative. If the patient is weak and in danger of shock, I have found strychnine very valuable. Glucose and chloride solution should be continued until the patient can take fluid by mouth without any distress or distension. After the operation the bowels will be more or less paralyzed from the added injury due to handling; therefore, they should be kept at rest. This will remove the gas and the patient may be permitted to take some water to satisfy the thirst. Later the tube may be clamped off for short intervals, but the bowels should not be permitted to become distended.

In order to illustrate and emphasize the diagnosis and treatment of this condition, I wish to give a brief history of a few cases that have come under my observation.

Acute Obstruction Following Herniotomy.—A man, aged sixty-seven, operated on for left inguinal hernia, on April 5, 1924, developed severe abdominal pain, distress and marked distention, and on the fourth day after the operation it was apparent that he had an acute obstruction and was operated upon. The descending colon was greatly distended. A colostomy was made, but following the operation his temperature and pulse went up and he died in twenty-four hours.

A post-mortem showed that he had adhesions of the bowel to the peritoneum and on pulling the sac down and tying it off it produced a kink. I think he could have been saved by giving chloride solution intravenously and an enterostomy should have been made.

Obstruction with Enterostomy.—Following an operation for ectopic pregnancy and salpingitis, the patient's condition became very critical and on the fourth day an enterostomy tube was introduced under local anesthesia.

The second case was that of a woman, aged seventy-two, who had pain, vomiting and distention for six days when first seen. She was opened under local anesthesia. The bowel was greatly distended and an

abscess in right iliac region was found, no doubt due to a perforated appendix. A tube was introduced and the abscess drained.

The third case followed a hysterectomy. The patient had a great deal of pain, gastric distress and vomiting after operation and on the sixth day she was reopened. Obstruction was found near the ileocecal region, probably due to adhesions from a previous appendectomy and brought on by the operation. The obstruction was relieved, but because a large section of bowel was distended, an enterostomy tube was introduced for safety.

Postoperative Adhesions.—A woman, aged thirty-two, who had had three previous abdominal operations, had severe abdominal pain and vomiting. Morphine was given but the pain returned. Operation was performed twenty-two hours after onset. An adhesion of the ileum to a small ovarian cyst was found.

A man, aged thirty, who had had an appendectomy in 1918 complained of severe abdominal pain and vomiting. Morphine was given but the pain returned. At operation, twelve hours after the onset, a peritoneal band from the mesentery was found around the intestine.

There was one case in which operation was delayed because pain did not return after one dose of morphine. This patient, a woman of fifty-four years had been operated upon for a perforated appendix in 1930. She complained of pain and vomiting, but the bowels had moved. On removal to the hospital, thirty hours after the onset, the symptoms were so relieved by gastric lavage and a duodenal suction tube that no more morphine was required. Symptoms, however, returned and the patient became critically ill on the third day. On operation under local anesthesia an obstructing band was found crossing the ileum. In this case the duodenal suction tube was continued too long and misled me in the diagnosis.

Complete recovery in the above six cases.

Intussusception.—On August 16, 1923, a nine-months old boy was seen at the office. He had been vomiting and was restless and crying and blood was found in the stool. His temperature was 100 degrees. A harium enema was given at the office and the symptoms subsided.

The same symptoms returned on August 30 and again subsided.

On September 3, with a return of symptoms, the baby was sent to the hospital for diagnosis. The abdomen was not tender, was soft, and no tumor was felt.

On September 4, Dr. Chester Stewart was called in consultation. The child was vomiting a greenish fluid and passing bloody stools. A tumor was palpable on the right side and the x-ray examination showed an obstruction at the splenic flexure of the colon. Saline was given hypodermically and operation per the last attack. The appendix and ileum were found invaginated into the cecum and colon as far as the splenic flexure. This intussusception was reduced and stools and gas were passed the next morning. After

a stormy two days during which the temperature reached 105 degrees and the pulse 150, recovery followed and the infant was sent home the sixth day after operation.

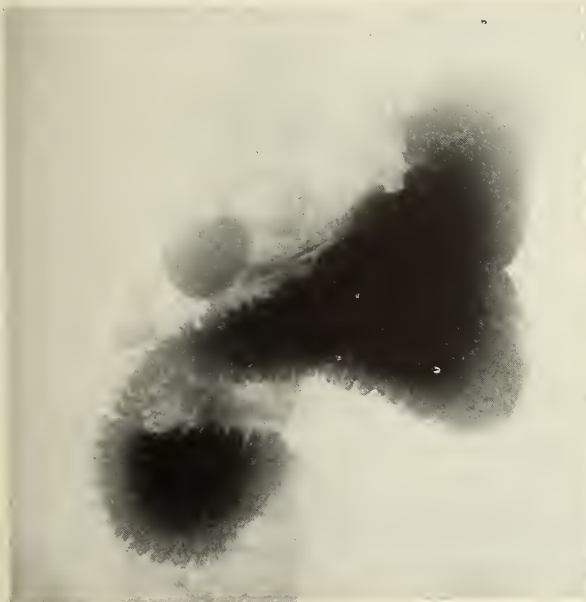


Fig. 1. A woman, aged thirty-five, with obstruction high in the jejunum. After barium given by mouth.



Fig. 2. Six hours later. Complete obstruction in the jejunum.

Intussusception in an adult is very rare and as I have not been able to find a case reported where it occurred high in the jejunum, I desire to report the case of a married woman, thirty-five years of age, who was seen August 14, 1934. She had had a sudden continuous pain in the epigastrium, with chills, and had a marked rigidity and tenderness over the right hypochondrium. Temperature and pulse were normal and two doses of morphine were required for relief. A diagnosis of gallstone colic was made. X-ray of the gallbladder in 1929 had shown good function and there had been no previous operations.

On the night of February 14, 1935, the patient had a similar attack which was relieved by morphine.

On the night of February 22, her husband called me by telephone, saying that his wife was having another attack. I ordered her to the hospital. There was no doubt in my mind but that she had gallstones. On admittance to the hospital, morphine was given and glucose administered intravenously.

After the examination, in the hospital the following morning, I was positive that the patient had gallstones. Temperature and pulse were again normal. Her general condition was good and she did not have much pain. She vomited some during the day. An enema was effectual.

The hospital interne called me at 5:00 a. m., February 24, and said the patient had passed some bloody stools. He found a mass on the left upper side of abdomen. I went down to the hospital immediately. I found a circumscribed tender mass on the left upper

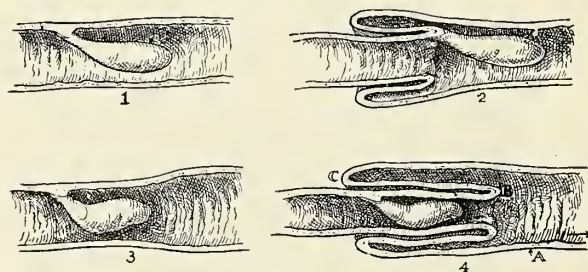


Fig. 3. Intussusception. Two methods by which a tumor may cause invagination. The lettering indicates the parts of an intussusception: A, the sheath; B, the apex of the intussuscepted loop; C, the neck of the intussusception.

tumor of the left kidney that had been overlooked on previous examination. She continued to have pain and a great deal of vomiting and required morphine. She was kept up by glucose and saline solutions.

In order to determine if this tumor was in the kidney an intravenous urography was made on February 26. Dr. Nordin reported the kidneys normal, but said there was a suggestion of partial obstruction of the bowel.

On February 27, an x-ray was taken which showed complete obstruction high up in the jejunum.

Dr. James Johnson was called in consultation. Her temperature had been around 100 and pulse between 80 and 100 since she entered the hospital.

Operation was performed five days after she entered the hospital. Glucose was given before the operation. Six hundred c.c. acacia solution was given during the

operation and blood transfusion following. Intussusception of the upper part of the jejunum with marked discoloration and inflammation was found. The tumor mass, which was about 12 inches in diameter, was resected, and a lateral anastomosis was made.

The pathologist reported a "papillary type of growth with necrosis and very vascular and degenerated polyp in the wall of jejunum." Strychnine sulphate in 1/30 grain doses was given every four hours. Glucose and saline solution and nasal suction continued until the fifth day after operation.

Complete recovery occurred and the patient was discharged on the twenty-first day after operation. She has had no more gallbladder attacks.

Summary

1. Pain is the first and most reliable sign of acute obstruction. Morphine should not be given until the diagnosis is made; at least, not the second dose.

2. The earlier the operation the better the prognosis, but of greater importance is the giving of saline solution before and after operation to prevent dehydration and hypochloremia.

3. Glucose, in 10 to 20 per cent solution, should be given to furnish energy.

4. Enterostomy should be performed if the patient is in a serious condition, in order to relieve the distention and to drain the toxic fluid present in the bowel.

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VARICOSE VEINS OF THE BROAD LIGAMENTS

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THERE are several seasons for presenting this subject, the main one being that in our experience varicose veins of the broad ligaments are encountered far more frequently, when looked for, than textbooks and gynecological literature would indicate, and further, they seem to be responsible for more disability than has generally been supposed. In several cases, in fact, we have found them to be apparently the sole cause for bitter complaints of pelvic distress, and by doing nothing more than obliterating these veins, we have been able to completely relieve the symptoms. We feel, therefore, that it is timely to discuss this condition, bringing it to your attention so that it may be borne in mind when diagnosing and treating women with pelvic complaints, for, unless thought of, it is very easily overlooked. Unless corrected, complete relief will not be secured, and if allowed to go on it leads to other still more disabling disease.

The literature on the subject dates back to 1854, when Richet¹⁹ reported a case of "Tubo-

ovarian Varicocele." The first American case was reported by Dwight⁶ in 1877. Dudley⁵ in 1888 gave a classical discussion of varicocele of the broad ligament and reported four cases. Eight cases were reported by Miller and Kavel¹⁵ in 1905. An operative technic (the so-called "Argentine operation") was described by Castano^{1,2} in 1926. Emge in two papers in 1921 and 1925 gave a good anatomical discussion^{7,8} and reported fifty-nine cases. Darnall⁴ in 1914 reported six cases. There are in addition to these papers a few scattered case reports and discussions.^{3, 9, 10, 11, 12, 13, 14, 16, 17, 18, 20, 21, 22, 23, 24, 25} The subject receives scant consideration in the textbooks, being limited to short paragraphs in one or two of the standard texts. Part of the purpose of this paper is to report data on twenty-five cases.

In discussing this subject, it is necessary to understand the anatomical considerations⁷ involved. Venous drainage of the pelvis is obtained through five plexi of veins: the vaginal, uterine and hemorrhoidal, which all drain into

the inferior hypogastric veins, and the two pampiniform plexi which empty through the ovarian veins. The right ovarian vein empties directly into the vena cava, the left into the left renal vein. There is only one valve in this system, that at the end of the right ovarian vein.

The support of the pampiniform vessels is very poor, the only real support being at the uterine ends, the ovarian ends hanging free like a hammock, the only fixation occurring higher, at the point where the ovarian vein passes over the pelvic brim. There are two portions to each plexus, one above and one below the hilus of the ovary. The lower half is very tortuous and consists of numerous branches. The support for these veins is poor in connective tissue and contains practically no muscle fibers. Where the pampiniform plexus empties into the ovarian vein there is for a distance of 7 to 9 cm. no support except for the two thin layers of peritoneum. When the body is erect the lower third of the ovarian vein forms an inverted parabola, the upper two-thirds rising vertically to the vena cava on the right and the renal vein on the left side. There is some protection from back pressure on the right, due to the single valve at the vena cava. The absence of a valve on the left side, together with the fact that the left ovarian vein empties into the left renal vein at a right angle may account for an increased back pressure and the greater frequency of varicosities on the left side.

Considering the above facts, the mechanism of the formation of varicosities may be formulated as follows: If for any reason there is congestion in the ovarian circulation the veins, because they have practically no support, must dilate. This distension takes place first at the lowest point of the inverted parabola of the ovarian vein because here two antagonistic physical forces meet, the weight of the column of blood rising vertically and the driving force of the increased column of blood coming from the other direction. The weight of the vertical column overcomes the driving force because the latter is weakened by the compensatory distension of the venous channels. With progressive distention, the other units of the pampiniform plexus are gradually affected, until ultimately the uterine and other plexi are involved also by virtue of their intimate relation through the

anastomotic uterine veins. In long-standing varicose veins there obtains a passive congestion of the pelvic organs. The ovaries are first affected, showing fibrous and cystic changes. This may be an etiologic factor in the so-called "sclerocystic" ovaries that we see. Later the uterus becomes involved, the endometrium becoming edematous and hyperplastic, the cervix hypertrophies and later the fundus also, giving us the so-called fibrosed uterus.⁷

Histologically, the "characteristic feature of the varicocele is the lesion of the vein wall, extending over the three layers of the vein, which is filled with sclerotic tissue from the endo-vein up to the middle part. This sclerotic tissue encircles the vein and produces a sort of periphlebitis, which involves the adjacent nerves, and here we have the explanation of the pains, the neuritis of varicocele."²

Etiologic factors are divided into predisposing and active. The predisposing causes are: (1) the anatomic peculiarities of the pelvic venous system already mentioned; (2) visceroptosis; (3) poor general health with impaired muscular tonus.

Among active causes pregnancy with subinvolution and pelvic engorgement is given the most prominent place. Twenty-one of our twenty-five patients were married and eighteen had borne an average of two children each. All of us have probably observed, during cesarean section, the engorged condition of these veins, and can easily imagine that, if subinvolution occurs and this distension persists, permanent dilatation can easily result. Retroversions, pelvic tumors, obstipation with straining, prolonged and oft-repeated sexual excitement (particularly when unsatisfied), and finally, any factor causing increased intraabdominal pressure may also produce the same effect. We have not seen them in connection with prolapse of the uterus. Syphilis, considered by Castano² a major cause, has been absolutely inoperative in our cases.

There are no symptoms definitely pathognomonic of this condition. In our experience and that of others who report, history and examination have resulted in diagnoses of ovarian cyst, salpingitis, pelvic inflammatory disease and even ectopic pregnancy. The chief complaint usually made is that of pain, which is of a dull, deep, aching, often burning character, located usually

on the left side, present low in front and in back. The pain is aggravated by long standing, and relieved by lying down or assuming the knee-chest position. It is usually worse just before menstruation. Another common complaint is that of leukorrhea, most commonly of the hydrorrhea type. There is also often a change in the menstrual cycle, the interval at first being shortened and then prolonged, the flow becoming more profuse. These women are usually of a nervous, melancholic disposition. Darnall,⁴ in his paper, says: "We must remember that there is a reason for almost every physical discomfort if we can but run it down, and there is a reason for the child-bearing woman who vainly goes from one physician to another with aching pains in the pelvis and back, dragging sensation worse on standing and walking and worse at the menstrual period, and suffering from all the symptoms of pelvic engorgement and pelvic irritation, although the examining physician may not be able to palpate anything on physical examination on which to base a diagnosis."

The physical findings are few in view of the bitterness of the complaints. There is no abdominal rigidity, no tenderness over the sacrum. No definite masses are felt in the adnexal regions, there being at best just a sense of boggiess. There is, however, in spite of the negative findings, extreme tenderness on palpating the adnexal regions. The diagnosis, therefore, must be made by exclusion. In the absence of cervical infection, and given the symptoms of almost any of the pelvic conditions associated with enlargement of one of the organs, and not finding any masses, but only tenderness, a diagnosis of varicosities of the broad ligament can be entertained. Having the patient sit or stand after she has been examined in the horizontal position, and keeping the fingers in place, has been advocated. One is supposed to be able to feel the veins balloon out. In our hands this procedure has not been of definite help. On the operating table, the broad ligaments must be examined before the Trendelenburg position is assumed, as the veins will then empty. When dilated they are very easily identified, looking and feeling just like a scrotal varicocele, the analogous condition in the male.

The only treatment of any benefit is surgical. Palliative measures such as hot douches, glycerine

tampons, frequent assumption of the knee-chest position, etc., have been tried with no definite relief. Surgical treatment advocated varies from conservative measures such as ligation of the engorged veins, and of ventral suspension of the uterus, to radical procedures like removal of the ovaries, tubes and broad ligaments. Castano² has described an operation in which he strips the peritoneum from the utero-ovarian vein at the ilio-ovarian ligament, doubly ligates the vein and then severs it. In our cases we have usually employed multiple ligation when no other abnormality was found, and have obtained complete relief of symptoms.

TABLE I

Symptoms	
Lower Abdominal Pain.....	16
Leukorrhea	14
Lower Back Pain.....	13
Sense of Weight in Pelvis.....	13
Dysmenorrhea	11
Pain Worse Upon Activity.....	9
Metrorrhagia	9
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Pelvic Findings	
Tenderness in Adnexa Without Definite Mass.....	12
Tender Cystic Mass.....	8
Retroversion	5
Pre-operative Diagnosis	
Ovarian Cyst	7
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Chronic Appendicitis.....	6
Acute Appendicitis.....	3
Ectopic Pregnancy.....	2
Exploratory Laparotomy.....	1
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Varicose Veins Alone or With Sclero-Cystic Ovaries	9
Same with Fibrosis Uteri.....	8
Retroversion	5
Appreciable-sized Ovarian Cysts.....	3
Operative Treatment	
Multiple Ligation.....	14
Wedge of Broad Ligament Removed with Tube...	9
Uterine Suspension	1
Uterine Suspension with Ligation.....	1

In the accompanying table are given some of the data obtained from the study of twenty-five cases found to have varicose veins of the broad ligament at the time of operation, during the period 1931-1935. In none of these cases did we feel justified in making a primary preoperative diagnosis of varicose veins, because of other suggestive findings on examination, although in the later cases we have felt more bold in giving it consideration in patients with severe distress and paucity of findings.

As seen from the first grouping, the symptoms most commonly complained of are leukorrhea,

pain in the back and lower abdomen and sense of weight in the pelvis, with other symptoms occurring less often. None of these is, of course, pathognomonic of this condition.

Among pelvic findings, tenderness, with or without suggestion of a mass, is a characteristic finding. Usually there has been enough evidence of resistance to palpation to lead us to make a tentative diagnosis of chronic salpingitis or ovarian cyst. In two cases the history and findings led us to a diagnosis of tubal pregnancy. An exploratory laparotomy after a long period of distress with no findings on examination was resorted to in one case. Nine patients were operated upon primarily for an appendicitis, acute or recurrent, but there were also in the history and routine pelvic examinations evidence of pelvic pathology, explained by the presence of these varicose veins, and completely relieved by their treatment.

The operative findings are interesting, in fact it is because of some of them that we have drawn some of our conclusions. In nine cases in spite of severe pelvic pain and distress, nothing was found in the pelvis at time of operation except varicose veins, either alone or with these small ovaries studded with minute cysts, which are considered by some to be the result of long-standing varicose veins. In eight other cases nothing additional was found but indications of fibrosis of the uterus. It seems striking to us that severe pelvic pain was present in these seventeen patients with no other disease present. In three cases cysts one inch or more in diameter were found. Retroversion, associated with varicose veins, was found in five cases.

Operative treatment in the majority of cases consisted of multiple ligation of the varicose radicals with the idea of forming thrombi between the ligated points. This method of treatment has given complete relief of pain. In nine cases, due to associated tubal pathology or at the request of the patient, a wedge of the broad ligament was removed with the tube. In addition to ligation, the uterus was suspended in two cases. We have not resected the veins between the ligatures because the relief secured by simple ligation has so far in our series been permanent.

Conclusions

1. Varicose veins of the broad ligament without other disease being present are a definite cause of pelvic pain.
2. Correcting this condition completely relieves the pain and attending symptoms.
3. From an anatomical and pathological consideration it may be stated that when allowed to persist varicose veins lead to congestive changes in the ovaries and uterus.
4. Failure of other types of pelvic operations to completely relieve symptoms may be due to overlooking the presence of varicose veins of the broad ligament.

I am indebted to Dr. O. I. Sohlberg, Saint Paul, for permission to include his cases in this report.

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CLINICAL PATHOLOGIC SEMINAR*

Conducted by E. T. BELL, M.D.

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Eclampsia

Case 9.—A woman, thirty-one years old, a primipara, was first observed by a physician early in her pregnancy, at which time the urine and blood pressure were normal. During the first three weeks of January she had edema of the ankles frequently. On January 22 she was seen by a physician, who found a slight edema of the lower extremities; albumin in the urine; blood pressure 120/80. She was put on a milk diet and advised to rest.

She was next seen on February 5, at which time the blood pressure was 152/92. There was slight edema of the legs and ankles and moderate albuminuria. She was having some headaches. She was admitted to the hospital on February 15 in a state of coma. Blood pressure was 184/90; slight edema of the lower extremities. Urine was loaded with granular and hyaline casts; albumin ++++; specific gravity 1.034. Very little urine was being excreted; 4 ounces removed by catheter.

Blood chemistry on the day of admission showed: creatinin 1.5 mg; urea nitrogen 27 mg.; blood sugar .15 per cent; van Slyke 46. Temperature on admission was 99°; this gradually rose, attaining a maximum of 103° on the day of death.

Pregnancy was estimated to be of about five and one-half months' duration. A spontaneous abortion occurred shortly after admission. The patient did not recover from her coma. Death occurred February 18.

Positive postmortem findings: Bronchopneumonia of hypostatic type. The liver weighed 1,900 grams; there was extensive subcapsular hemorrhages over the greater part of the anterior surface. On section there was a cloudy parenchyma with numerous small red areas. The kidneys together weighed 300 grams and on section they were extremely pale and cloudy.

Microscopic examination: The liver showed extensive small areas of hemorrhagic necrosis (this is typical of eclampsia). The kidneys showed the characteristic thickening of the basement membrane of the glomerular capillaries.

Comment: The clinical picture established the diagnosis of eclampsia even though there were no convulsions; occasionally death occurs in eclampsia even though no convulsions have occurred. This is sometimes called eclampsia without convulsions; it is also often called pre-eclampsia. Albuminuria, edema and hypertension are sufficient to establish the diagnosis clinically. This is true eclampsia and not the nephritic toxemia of pregnancy, since the kidneys showed no lesion except the glomerular changes and the tubular swelling characteristic of eclampsia. It is also clear that this is not a nephritic toxemia because the blood pressure and the urine were normal early in the pregnancy. The diagnosis of eclampsia may be established at postmortem by the structural changes in the kidneys even in the absence of the typical hemorrhages in the liver.

Tetanus

Case 10.—A negro, thirty-three years old, was admitted to hospital September 2 complaining of pain in the chest and abdomen. He said that three days previously he had had a crampy sensation in the upper

abdomen and lower thorax. The condition became progressively worse until at the time of admission he was suffering from cramps in the upper abdomen and lower thorax every hour.

Temperature was 99.6°; pulse 72; respirations 24; blood pressure 115/70. Examination of the chest yielded no special findings. There was generalized rigidity of the abdomen without tenderness and without rebound tenderness. There was positive psoas contraction. No masses were palpable. The extremities were normal except for an old injury to the middle finger of the right hand; this crushing injury had occurred two weeks previously and again one week previously. It had resulted in loss of the nail, which had been removed at the dispensary. The patient had vomited once but there was no blood in the vomitus. There were no intestinal noises. A flat plate of the abdomen showed nothing of importance. The leukocyte count was 8,000. The urine was normal.

On the day after admission the surgical staff suggested that the abdominal rigidity was probably of central origin. An emergency Kahn test gave negative findings.

Late in the evening of the second day the patient had a spasm of the spinal muscles with retraction of the head; he was found to be lying on his side in marked opisthotonos. Reflexes were questionable but probably normal. Spinal fluid was under pressure; it was cloudy and contained four cells.

The following morning the patient responded only vaguely when spoken to and still had spasm of the muscles and rigidity on stimulation, such as taking the pulse. The finger had been incised freely and wet Dakin's packs had been applied. From time to time there were attacks of sudden stiffening of the body. Perspiration was very profuse. Respirations became labored and rapid and death occurred in the evening of the second day of residence, September 4, at 8:40 p. m.

The only positive postmortem findings were as follows: The nail on the middle finger of the right hand was absent and the area was covered with a crusted exudate; there were some recent surgical incisions in the finger; there was only moderate swelling. There was no regional adenopathy. There was some cloudy swelling of the liver and kidneys and purulent bronchitis. Tetanus bacilli were cultivated from the lesion on the middle finger.

Comment: This is a typical case of tetanus with onset about two weeks after the injury. It is to be noted that this was a crushing injury of the finger. The diagnosis was made clinically and was confirmed at postmortem examination by demonstration of tetanus bacilli in the wound and by the absence of major lesions in the various organs.

Primary Carcinoma of the Liver

Case 11.—The patient, a man seventy-two years old, was first seen October 8 complaining of pain in the upper right quadrant and increasing difficulty in obtaining bowel movements, two complaints which had been present about three weeks. Before this time his bowel movements had been normal. There had been progressive loss of weight, especially the last six months; he had lost 40 pounds during the last year. For six months there had been progressive weakness and fatigue.

At the hospital complete physical and gastro-intestinal examination was made. Conjunctiva and skin showed a slightly icteric tinge; skin was loose and muscles soft and flabby. Blood pressure was normal. Heart and circulatory function were satisfactory. Electrocardiogram was normal. The lungs were normal. Abdominal examination showed nothing unusual throughout; spleen and liver edges were not palpable. The Graham-Cole test showed a nonfunctioning gall bladder. Gastro-intestinal study, including a barium enema, resulted in no important findings except that the duodenal loop was rather wide. Urine and blood showed nothing abnormal. The Kahn reaction was negative. Liver function: bromosulphalein 100 per cent retention at the end of five minutes, 30 per cent at the end of thirty minutes. A direct van den Bergh test gave negative findings; indirect quantitative 1.2 units. In view of the fact that the patient was on the threshold of clinical jaundice the retention of dye on the part of the liver was not given serious consideration.

He returned to his home. At the end of three weeks the bowels were moving satisfactorily; he was free from pain; felt generally improved; quantitative van den Bergh reaction was almost normal (.5 unit). Later he had rather sharp pain in the right upper quadrant in an attack suggestive of acute cholecystitis, rather mild in degree. About a week later while in the bathroom he had a collapse, apparently from weakness. From this time on he sometimes felt quite well but did not attain the same level of well-being that he had in the first three weeks after he left the hospital. In spite of good fluid intake he always had a dry tongue and dry mouth; he had very poor appetite, physical weakness and loss of weight.

Seven days before death liver function test showed: bromsulphalein 80 per cent retention in five minutes, 15 per cent in thirty minutes; quantitative van den Bergh 1.4 reaction direct negative. December 18 blood sugar was 108 mg.; nonprotein nitrogen 39 mg.; blood chlorides .453. On December 21 he was definitely jaundiced with abdominal distention and ascites. The distention increased daily. The upper portion of the abdomen felt hard and unyielding; this condition persisted. He died December 25, at 8 p. m.

At postmortem examination the peritoneal cavity contained about 1500 c.c. of bloody fluid with numerous clots of blood. The bleeding evidently came from a projecting mass of tumor on the surface of the liver. The heart weighed 400 grams and showed no disease. The spleen weighed 200 grams and showed chronic passive congestion. The liver weighed 2800 grams. On the right part of the inferior surface was a projecting mass of tumor about 6 cm. in diameter, from which bleeding had occurred. On section all of the entire right lobe and portions of the left lobe were replaced by tumor. There was only a thin layer of liver tissue covering the tumor in the right lobe. The weight of the liver after removing the most of the tumor was 1200 grams. The central portions of the tumor were hemorrhagic and necrotic. There was a tumor thrombus partly occluding the portal vein. The hepatic veins were free from tumor. The portions of the liver not involved by tumor were compressed and bile-stained. The gall bladder showed no disease. There were no lesions of the gastro-intestinal tract. There were no metastases of the tumor.

Microscopic sections showed typical hepatoma composed of cords of cells closely resembling liver.

Diagnoses: Primary carcinoma of the liver (liver cell hepatoma). Intraperitoneal hemorrhage from a necrotic tumor nodule.

Comment.—It is not clear why the enlarged liver was not recognized on physical examination but the abdominal wall was very thick. Liver function test suggested extensive destruction of liver tissue but it was not clear

clinically what the nature of the hepatic lesion was. The clinical diagnosis of primary carcinoma of the liver may be established with reasonable certainty by the enlargement of the liver in the absence of any evidence of a primary tumor elsewhere. Thorotrast injections sometimes lead to the correct diagnosis of primary tumor because the hepatoma, unlike metastatic tumors, takes up the thorotrast.

Syphilitic Aortitis

Case 12.—A man, forty-three years old, was admitted to hospital January 9 because of extreme orthopnea, dyspnea, palpitation, tachycardia and swelling of the ankles. He was married; his wife is living and well and has a negative Wassermann reaction; four children are living and well.

In 1911 at the age of nineteen he contracted gonorrhea; there was no history of primary syphilitic infection. In 1915 he had an attack of palpitation, dyspnea and orthopnea. He recovered from this and was free from symptoms for several years. In 1932 he was under observation for what was diagnosed as goiter and was advised to have thyroidectomy. He consulted another physician, who discovered enlargement of the heart with an aortic lesion and signs of regurgitation; his Wassermann reaction was positive.

Some time in 1933 he began to have attacks of dyspnea, orthopnea and edema of the ankles. These attacks were relieved to some extent by treatment. He was never willing to remain in bed and was up and about even during the attacks. During the eighteen months previous to admission he had been given seven arm and hip injections, presumably for syphilis.

Physical examination on admission showed a well developed, fairly well nourished white man with extreme dyspnea and orthopnea. The pupils reacted to light and accommodation. Ears and throat were normal; lungs also. The heart was enlarged to the left and right; the apex beat was visible with a palpable thrill; to and fro murmurs were heard over the mitral area and a systolic murmur over the aortic. There was slight pitting edema of the feet. There were no positive findings in the abdomen. Knee jerks were sluggish and the Babinski reaction was negative. Blood pressure in the right arm was 140/50, in the left arm 190/36. Urine: specific gravity 1.019; albumin +; a few casts. Blood: hemoglobin 70 per cent; erythrocytes 4,630,000; leukocytes 4,600 with 58 per cent polymorphonuclears, thirty-seven per cent lymphocytes; Wassermann +++++; Kahn +++++.

Death occurred suddenly on January 15, six days after admission.

At autopsy the heart weighed 1020 grams; there was marked hypertrophy of the left ventricle; the mitral, tricuspid and pulmonary valves were normal; the aortic valve showed diffuse irregular leathery thickening throughout. There was similar diffuse whitish leathery thickening of the root of the aorta without calcification or atheroma. The coronary orifices were patent and the coronary arteries showed no disease. There was slight dilation of the ascending aorta. There was no pneumonia. The spleen weighed 220 grams and showed chronic passive congestion. The liver weighed 1950 grams and showed chronic passive congestion. There was no disease of any other organs.

Diagnoses: 1. Syphilitic aortitis with involvement of the aortic valve producing aortic insufficiency.

2. Marked hypertrophy and dilation of the heart with cardiac failure and general venous congestion.

Comment: The syphilis was probably contracted in 1911 or thereabouts. The cardiac attack which the patient had four years later was probably due to syphilitic aortitis. Evidently the syphilitic aortitis had per-

(Continued on page 398)

EDITORIAL

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

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The A. M. A. Meeting

THE seventy-ninth annual meeting of the American Medical Association was in every way gratifying, and from the point of attendance eminently successful, the registration numbering over 6,500. The new auditorium at Kansas City is entirely adequate for the housing of large conventions. The scientific exhibits were outstanding in variety and received well-deserved attention, while the commercial display, large and wonderfully well arranged, attracted crowds at all times. Meeting halls for the various section meetings were all that could be desired.

There were a total of one hundred and sixty-three delegates in attendance, representing the several states and territories, the sections, the Army, Navy, and the United States Public Health groups of the Federal service. The meetings of the House were conducted in the orderly and dignified way characteristic of the deliberations of that body. It was pleasing to note that

the traditional relation between doctor and patient was strongly upheld.

The serious illness of the president-elect, Dr. J. Tate Mason, of Seattle, had a noticeably depressing effect on the members of the House. Dr. Mason was by unanimous vote installed as president in absentia on Wednesday evening. Dr. John H. J. Upham, Dean and Professor of Medicine at Ohio State University, Columbus, Ohio, was named president-elect, and Dr. Charles Gordon Heyd, Professor of Clinical Surgery at Columbia, New York, as vice president, all the other officers being re-elected.

The House went on record as disapproving of x-ray diagnosis and treatment by lay organizations, and requested the appointment of a committee by the board of trustees to study the subject of Air Conditioning in association with competent engineers. Legislation of value to the organized profession of medicine received a good share of attention.

Atlantic City won out over Philadelphia by a vote of 70 to 69 as the place of meeting for 1937.

J. T. C.

The State Meeting

OUR annual meeting at Rochester last month was attended by a good percentage of the membership, some 1,470 Minnesota physicians having registered. The 195 from other states included forty-nine from Wisconsin, forty-three from Iowa, twenty-six from North Dakota, fifteen from Illinois, some twenty-nine states having been represented. In addition there were thirty-five physicians from Canada and foreign countries. Some 150 of those attending the gathering of the American Association of Thoracic Surgeons which met at the same time in Rochester, also registered at our meeting. Including 187 nurses, 544 Women's Auxiliary members and 107 exhibitors, the total registration numbered 2,688.

Dr. Olin West, our national secretary, was prevented by illness from making his scheduled address Monday evening. His place was ably taken by Dr. H. H. Shoulders of Nashville, who gave

an able presentation of economic phases of medical practice.

At the Monday evening meeting Dr. W. J. Mayo introduced Sir Henry Wellcome to the audience. Sir Henry Wellcome lived as a boy in Garden City, Minnesota, and at the age of sixteen obtained a position with the Boole and Geisinger Drug Store in Rochester, Minnesota. At the age of nineteen, on the advice of Dr. W. W. Mayo, father of Drs. W. J. Mayo and Charles Mayo, Henry Wellcome went to Philadelphia to study chemistry and graduated from the University of Pennsylvania. After some practical experience he went to England and founded the pharmaceutical house of Burroughs Wellcome and Company. In 1913 he founded in London the Wellcome Historical Medical Museum and later the Wellcome Research Institute, which is known throughout the world. For his outstanding work and contributions to science he was knighted by the King of England.

The "G Men" exhibit and address by one of Uncle Sam's staff proved interesting. It was a surprise to many that the criminal detective activities of this branch of the public service comprise such a small percentage of the 80,000 cases yearly investigated.

The House of Delegates chose an outstanding member of the profession as president for 1937—Dr. A. W. Adson of Rochester. Other officers elected include Dr. H. W. Goehrs, Saint Cloud, first vice president; Dr. D. P. Head of Minneapolis, second vice president; Dr. E. A. Meyerding, Saint Paul, secretary, and Dr. W. H. Condit, Minneapolis, treasurer. A. M. A. delegates elected were Dr. W. F. Braasch, Rochester, and Dr. W. A. Coventry, Duluth, with Dr. W. L. Burnap, Fergus Falls, and Dr. George Earl, Saint Paul, as alternates.

Dr. J. S. Holbrook, Mankato, Dr. J. M. Hayes, Minneapolis, and Dr. W. L. Burnap, Fergus Falls, were re-elected councillors for the fourth, sixth and eighth districts respectively.

Dr. R. G. Green received the medal presented yearly by the Southern Minnesota Medical Association for the best scientific exhibit. Dr. Green's display was on tularemia and certain filterable viruses.

The next annual meeting will be held in Saint Paul in the spring of 1937, the exact date to be determined by the Council.

Prevention of Tularemia

THE investigations which have been made by Dr. Robert G. Green of the University on the subject of the distribution of tularemia in animals and birds should be of practical interest to physicians.

Dr. Green has been devoting much of his time during the past ten years to personally investigating the incidence and transmission of tularemia. His address before the Minnesota Academy of Medicine last month elicited much interest, and discussion brought out a number of valuable points to be observed in the prevention of human infection.

Dr. Green has found that tularemia is widespread in small animals and birds in the territory investigated, which extends from Hudson Bay south to the Gulf. He has reason to believe this infection is present throughout North America from northern Canada to central Mexico. It has not been found in South America but has been reported in the Scandinavian countries, Germany, Russia and Japan. It probably is not a new disease although it was first discovered in 1912 by McCoy in the ground squirrels of Tulare County, California, hence its name. It was known that rabbits were dangerous as an article of food when Moses declared them unclean. (Leviticus XI :6, 8.)

A rather strange finding has been the frequent presence of tularemia in rabbits in May and June and in September and October, but not in July and August. This leads to the assumption that hot weather has something to do with the limitation of the infection in the animal kingdom.

The greatest danger of human transmission is from infection of an abrasion by handling a diseased animal or bird, the cottontail rabbit being most frequently infected of all small animals. The rabbit and grouse ticks with which these animals are heavily infested disseminate the disease among animals while the ordinary wood tick and deer fly may transmit it to human beings. Deer fly fever has been proven to be tularemia.

What precautions, then, are advisable for the individual who roams the woods in Minnesota? First, care in the handling of small game and game birds, considering all infected until proven otherwise. Wood ticks are particularly prevalent in May and June, in Minnesota, but disappear about the Fourth of July. After a walk in the woods during these two months one should

strip and make a thorough search for wood ticks. If a tick is found attached, a good disinfectant should be used before it is removed. Castor oil soap has been found particularly effective. The reason for this procedure is that the infection of tularemia is not transmitted by the bite of the wood tick but by the contamination of the wound from the feces of the tick. The tick does not defecate until it has started to engorge, so there is more danger of human infection from an overlooked tick than from one simply attached.

From the known facts it may be concluded that hunting is comparatively safe in late October but rather dangerous in September.

While tularemia presents a difficult problem for the epizootologist and the transmission to human beings merits consideration (some sixty cases having been reported in 1935 and forty in 1934), the fact remains that of the thousands of individuals bitten each year by wood ticks relatively few are infected. It is further reassuring that the mortality is only 2 or 3 per cent. There is no reason, however, why members of the profession should not inform the public how to avoid possible infection.

Variations in Liver Extracts

THE discovery of the value of liver in the treatment of pernicious anemia first was made available to the profession in 1926. Eating the necessary amount of liver daily (preferably raw) was anything but agreeable for the patient and became expensive as the price of liver rose. Soon liver extracts to be taken orally were prepared, but this was even more expensive treatment.

The production of liver extract to be given intramuscularly has been a further triumph and its use has almost entirely replaced other methods of administration of liver or its extracts.

Unfortunately, however, liver extracts have not been standardized according to units of efficacy. Numerous pharmaceutical houses offer extracts of which one, two, three or more cubic centimeters represent extractions from 100 grams of liver, and the physician is ignorant as to methods of extraction and whether the extracts produced by the various concerns are comparable according to grams of liver extracted. One brand is equivalent to so many grams of

liver by mouth and another which is less expensive than the rest is accompanied by no statement as to how much liver is extracted to produce one cubic centimeter of extract. One of the fundamental considerations in therapy is to know what dosage is prescribed. The physician is at present decidedly at a loss to know which of the various priced liver extracts to choose and with the present status of affairs is forced to choose one at random and check his dosage by frequent blood counts.

On the other hand, patients with pernicious anemia vary markedly in their response to the parenteral administration of liver extract. For this reason no standardized dose of any one preparation can be given for all patients.

In our February issue an approximate idea of usual dosage of liver extracts was given in an excellent article by Murphy. His usual procedure has been to give within twelve or twenty-four hours the extract from 400 grams of liver intramuscularly and at the end of a month the extract from 100 grams weekly until the blood count reaches 5,000,000 and then the same dose at two, three or four week intervals as needed to maintain this count. The same author has tested an extract one cubic centimeter of which contains the extract from 100 grams of liver and has recently reported* that the efficacy of this preparation corresponds closely to the weaker extract of three cubic centimeters derived from the same amount of liver.

For a physician who is unable to check the efficacy of his treatment with frequent blood counts, it is desirable to give somewhat more than the average dosage mentioned above. Blood counts at certain intervals enable one to regulate amount and frequency of injections with much greater accuracy.

The modern treatment of pernicious anemia is highly efficacious, although it must be continued indefinitely.

The parenteral use of liver extracts, even though the most expensive are used and even though the treatment must be continued indefinitely, is much less expensive for the patient if properly used than the oral administration of liver or liver extract. The physician, however, should realize the difference in potency of the various liver extracts available.

*Murphy, W. P.: Treatment of pernicious anemia with intramuscular injections of a highly concentrated solution of liver extract. *Am. Jour. Med. Sci.*, 191:597, (May) 1936.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

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What Can I Do for My County and State Medical Society?

Suggestion Number Six

Do you know the Senator from your own legislative district?

Do you know the Representatives from your district?

If not, make it a point to know both.

1. Find out how they feel about Organized Medicine.

2. Find out what their views are on quack medicine, too—on state medicine. And on all of the economic and social problems that confront the medical profession today.

Friendly, informal conferences on these matters between legislators and the doctors in their own districts provide an excellent source of accurate information for legislators.

Information thus secured on the policies of the legislators will be of value, also, to the Committee on Public Policy and Legislation of the State Association.

Delegates and Councilors Meet

A lively interest in medical organization and in the relation of physicians to the social and economic problems of the times was evident at the Rochester meeting of the Minnesota State Medical Association.

Delegates and Council members and officers willingly gave an extra day exclusively to attendance on Council and House of Delegates' meetings Sunday, May 3. Thirty-eight delegates attended the sessions and the hall was filled at all times with members, delegates and non-delegates alike.

New Constitution

Results: Provisional adoption of a revised constitution for the state association. This new constitution eliminates anachronisms and con-

traditions. It provides modern machinery for the conduct of the ever more complicated and far-reaching business of medical organization and reorganizes and revises the old, top-heavy and overlapping structure of committees.

This was perhaps the most laborious and time-consuming task before either of the governing bodies of the organization at this session.

For New Legislation

Adoption, also, of concrete recommendations for the information and guidance of the Interim Commission of the Legislature and others who are engaged on the task of formulation of new relief legislation to be presented at the next Legislature.

These recommendations and some appended resolutions with regard to the future of the State Board of Health and with regard, also, to the legal provision for medical care for old age pensioners, will supply medical men in the individual counties with a concrete guide and measure to help them in their individual arrangements with county officials for medical care of the sick poor.

Better Understanding

Salutary discussion of several other issues, vital to organizations and individuals, resulted in no official action but contributed notably to the better understanding of the obligations and rights of medical men in their public and private relations to other men.

Among these debated issues were: the question of shortage of nurses; of the rights of patients and physicians under the Industrial Compensation Act; of the part that physicians are likely to play and the responsibilities that physicians must assume in the several sections of the Social Security Legislation involving health and medical care.

President's Message

The 83rd Annual Meeting of the Minnesota State Medical Association is over now and there has been the usual pleasant aftermath.

Visiting speakers have sent their compliments on the distinction of the program and organization of sessions and exhibits.

Technical exhibitors who measure meetings by an exact standard have again rated the annual Minnesota gathering at the top among state and section conventions of medical men.

It is borne in upon us again that one of the most important functions of a state medical association is its annual meeting; that no special, sectional session can take the place of the larger gathering where the leaders in all branches of medicine and surgery gather for discussion and exchange of knowledge.

A fine state meeting of high scientific standards and sufficient stellar attractions to draw men of all interests and specialties is one of our best guarantees against the evils of over-specialization in medicine.

It is also our best means of reaching all of our members directly and forcibly with the social and economic relations and problems of the medical profession and also its ever-enlarging relations with outside agencies and affairs.

Medicine in Minnesota is now embarked upon a new phase of these relations, that of active coöperation with these outside agencies in regulation of many phases of relief and welfare work that touch upon medical care. Important policies which are to guide medical representatives in their handling of these affairs were established by the House of Delegates at the 83rd meeting. They signify, among other things, a new sense of responsibility for the social welfare among physicians.

W. W. WILL, M.D., President,
Minnesota State Medical Assn.

Health and Security Plans

The Council of the Minnesota State Medical Association is the advisory body to the State Board of Health in the new program made possible under Title Six of the Act for the extension of Public Health.

Dr. A. J. Chesley, State Health Officer, appeared before the Council to outline the plans of the Board for expenditure of the approximate \$93,000 to be made available under the Act to his Board under supervision of the United States Public Health Service. The plans outlined by Dr. Chesley were substantially the same as those sketched in preliminary form at previous meet-

ings of the Council and reviewed in these columns.

The disposition of the Board and of Dr. Chesley has been consistently to work with organized medicine to extend necessary health measures to all the people of the state and not to infringe in any way upon the private practice of medicine.

Immunization

Bearing out this intention, the Board, at a subsequent meeting, definitely voted to leave all immunization and vaccination which may be promoted through the new Social Security organization definitely in the hands of the family physician.

The so-called "Minneapolis plan" was approved for the state by the Board as one method by which this policy may be carried out. This plan provided that the Division of Health should send all who applied for immunization or vaccination to the doctors of their choice among members of the Hennepin County Medical Society. Those who could not pay for the service themselves were paid for by the Board of Welfare through the Division of Health at a stipulated fee. Other methods for payment might be worked out in other communities according to conditions in each locality.

Passed by the House

Following are the recommendations for new relief legislation that were approved by the Council and passed by the House of Delegates, also the two resolutions bearing upon the State Board of Health and the medical care for the aged.

Three Recommendations

"The following considerations are regarded as fundamental to good medical care in Minnesota and are recommended by the House of Delegates of the Minnesota State Medical Association in session at Rochester, on May 3, for inclusion in the new relief and welfare legislation that is now being drawn up for enactment by the state legislature.

"1. That the proposed County Welfare Plan provide for medical care for the indigent poor; that the patient be allowed free choice of physician and that payment for this care be declared explicitly to be the responsibility of the county in which the patient resides.

"2. That the so-called 'county plan' for care of the indigent is preferable to the township plan and that

legislation should be enacted at the next session of the legislature requiring all counties to operate on a 'County Board of Welfare' plan.

"3. That legislation be enacted to permit state funds to be used to supplement county funds for care of the indigent."

Medical Care for the Aged

"WHEREAS, the following provision appears in the Minnesota law regarding old age pensions (c, under Section 5):

"While a recipient is receiving old age assistance, he shall not receive any other relief from the state or from any political subdivision thereof except for medical, dental, surgical or hospital assistance or nursing care"; and

"WHEREAS, the responsibility for providing this assistance and care rests with each individual county; and

"WHEREAS, county commissioners and welfare boards in a few instances have declined to provide this assistance and care to old age pensioners, most of whom are in frequent need of such care and who cannot pay for it out of their meager pensions; be it, therefore,

"RESOLVED, That the House of Delegates of the Minnesota State Medical Association go on record urging county commissioners and welfare boards to assume this responsibility and make special provision to care for needy old people."

For an Independent Board of Health

"WHEREAS, the Minnesota State Board of Health has a national reputation for progressiveness and efficiency; and

"WHEREAS, the function of a department of health is exclusively involved with the prevention of disease; and

"WHEREAS, this function operates most effectively when it is separate and independent from relief and care of the poor; be it

"RESOLVED, That this House of Delegates here record its recommendation that the State Board of Health be continued as an independent department of our state government coöperating with other welfare agencies; and be it also

"RESOLVED, That the State Department of Health be commended for its fine program and its close coöperation with the medical profession in Minnesota."

Thanks

Two other important resolutions passed the two bodies expressing appreciation on the part of physicians for the work of two New Deal administrators: Mr. L. P. Zimmerman, State Administrator for Relief, and Mr. Victor A. Christgau, State WPA Administrator.

The readiness of these two officials to hear the doctor's point of view on the relief and work relief problems in general and to coöperate in the application of the principles of good medi-

cal practice in all medical phases of their respective programs has earned the gratitude and respect of organized medicine. So has the willingness of Mr. Zimmerman and his staff, especially, to assist in perpetuating these principles in the new county organizations for relief.

Survey by the Secretary of a Year's Activities

Two or three reports of officers and committees submitted at this session stand out especially and deserve special mention here. (All the proceedings, including reports, will be published, in brief, in an early issue and should be studied.)

One of these is the report of Secretary E. A. Meyerding, which provided a review and evaluation of the work of the association for the year, touching upon the activities of many committees.

According to this review, physicians of Minnesota are actively engaged in a significant variety of undertakings. Their most immediate concern is involved, of course, in the solution of the problem of medical care for the sick poor. This problem, thanks to friendly and satisfactory relations with the state agencies concerned, is in a better position for ultimate satisfactory solution than ever before.

Policies Adopted Towards Social Security

By virtue of the Council's appointment as advisory committee to the State Board of Health in its new program, the state association is intimately concerned, also, in the progress of Social Security in Minnesota.

This concern takes the form, now, of the formulation of policies, chiefly. It must merge into an active and alert participation as the program itself takes shape in Minnesota. Otherwise, as in the solution of the relief problem, the chance to establish a fundamentally sound working basis for all these new social experiments will be gone forever.

The association has taken the lead during the year, also, in the important consultations with representatives of other professions, the pharmacists, dentists and nurses. The problem presented by changing standards for nurses' education is of vital interest to physicians. It comes within the purview of the state association and its Inter-professional Committee and is discussed elsewhere in these columns.

Debates, News Service, Et Cetera

The state association lent its assistance to debates and debate coaches in the year's debates on the subject of State Medicine. (See the final results of the regional debates which appear also in this issue.)

It carried on a medical lecture course for college students with the assistance of the Minnesota Public Health Association; a news service reaching all the rural newspapers of the state; a weekly radio program now in its eighth year and conducted from the start by Dr. William A. O'Brien of the University of Minnesota. It arranged for hundreds of talks by physicians before lay audiences and for a good many other talks by physicians before their own medical societies. It arranged for numerous conferences on social and economic matters, including the annual County Officers' Meeting.

Having recited details of these and a considerable number of other activities which should certainly be studied carefully by every member, the report came to a close with the following heartening conclusion:

"We Shall Not Fail"

"Clearly, at this state in our relations with all of the official agencies, it depends upon us and the wisdom and strength of our own organization whether we shall be able to maintain our independence and integrity as a profession in Minnesota.

"More than ever we need close organization, a closer contact between the affiliated county and district societies and the state office and between the county and district societies and their councilors. Members of the Council meet frequently, are in touch with new developments. In addition they are men of long experience in medical organization and familiar with the policies of Organized Medicine. They should have an intimate knowledge of the problems and undertakings of each society under their jurisdiction so that all may be brought into harmony with state-wide policies and plans.

"We have before us a critical year. Times and institutions are changing. Some of these changes are bad and we are bound to fight them. If our policies are worthy of our great tradition, however, and if we present a united front in maintaining them, we shall not fail."

Public Health Relations

Said the Committee on Public Health Education, Dr. L. R. Critchfield, chairman:

The problem of the Committee on Public

Health Education has become two-fold in the last few years.

It must extend public knowledge of medical procedures and increase public confidence in the medical profession. It must also make sure that the medical profession, for its part, is universally ready to participate in all the accepted modern protective procedures as well as in curative medicine.

The public educational services of the association carried on through this committee are well known. The committee is branching out more each year in its campaign to urge upon physicians the necessity for continuous postgraduate instruction in the techniques of immunization and protection against disease.

To quote from the report:

"The passage of the Social Security Act has brought to a new focus the question of immunization.

"Funds will be available to extend all phases of preventive medicine far beyond their present limits.

Who Shall Immunize?

"Who is to do this work? Will it be a recognized function of the family physician or will everybody agree to leave it to hired physicians? In that case who is to say where preventive medicine would end and where curative medicine, which is all that would belong to the family physician by right, would begin?

"The problem is not simple. Organized medicine and your Committee are convinced that only harm can come to the practice of medicine, to the public and to the physician if the preventive procedures—immunization against diphtheria, vaccination against smallpox, skin testing for tuberculosis—are allowed to slip from the hands of the private physician to those of public health and school officials."

Policies Favored

Members of the committee met to talk over policies at Rochester and went on record to the following effect:

That only such protective procedures as are standardized and proved beyond any doubt to be effective and safe for routine use should be recommended as required public health protections. Other immunization procedures which require the individual supervision of the doctor for safety or which are still in the experimental stage should be administered only on the responsibility of the individual physician in his private practice. By this action the committee decided to confine its recommendations at present to immunization against diphtheria and vaccination against smallpox for routine public health meas-

ures, and to the Schick and tuberculin skin tests for diagnostic tests.

Laxatives

That the action of the Olmsted-Houston-Fillmore-Dodge Medical Society, recommending use of stickers on all packages of laxatives sold, be commended and adopted by the committee. These stickers warn of the danger of taking laxatives in the presence of abdominal pain.

That the attention of broadcasting companies be called to the danger attendant upon uncontrolled use of laxatives and that letters of commendation be sent to the broadcasting companies that have already discontinued such programs. This recommendation by the committee was officially adopted by the House of Delegates at a subsequent meeting.

Contract Practice

The Committee to Study Contract Practice suggested that the important simplification of medical ethics relating to contract practice as revised by the Judicial Council of the American Medical Association in 1934 be especially endorsed and reaffirmed by the House of Delegates. The endorsement was given and the section is quoted here because of the definiteness and completeness with which this troubled question is treated.

Each county society was urged by the Delegates to use this code as a measure for all forms of contract practice within its locality.

Code

"By the term 'contract practice' as applied to medicine is meant the carrying out of an agreement between a physician or a group of physicians, as principals or agents, and a corporation, organization or individual, to furnish partial or full medical services to a group or class of individuals for a definite sum or a fixed rate per capita.

"Contract practice per se is not unethical. However, certain features or conditions if present make a contract unethical, among which are: 1. When there is a solicitation of patients, directly or indirectly. 2. When there is underbidding to secure the contract. 3. When the compensation is inadequate to assure good medical service. 4. When there is interference with reasonable competition in a community. 5. When free choice of physician is prevented. 6. When the conditions of employment make it impossible to render adequate service to the patients. 7. When the contract because of any of its provisions or practical results is contrary to sound public policy.

"Each contract should be considered on its own merits and in the light of surrounding conditions. Judgment should not be obscured by immediate, temporary or local results. The decision as to its ethical or unethical nature must be based on the ultimate effect for good or ill on the people as a whole."

Inter-Professional Relations

It has become increasingly apparent in the last few years that none of the professions concerned in the delivery of medical, hospital, dental and nursing care to the people can function in isolation and without consideration for the rest.

The ultimate objective of doctors, dentists, pharmacists and nurses is the delivery of good medical and health service to the public.

If one of these groups jostles the others the result is costly not only to the professional personnel directly involved but to the people they serve.

It is with that in mind, and also with the obvious thought that advancement of medical care can best be served by the coöperative effort of everybody involved, that physicians have sought to coördinate all of these professional groups. This coördination has taken the form of friendly conferences and mutual discussion of problems and differences under the auspices of the Inter-Professional Relationships Committee.

For Better Prescription Writing

This committee reported several fruitful conferences to the House of Delegates, made recommendations with regard to medical relationships with pharmacists and nurses which should bring results.

It recommended, for the pharmacists:

1. That the State Medical Association continue its conferences and coöperation with the pharmacists and that county medical societies likewise give the pharmacists opportunities for discussion of local problems.

2. That the Editing and Publishing Committee be asked to provide reasonable space for presentation of problems of the pharmacists to the doctors in MINNESOTA MEDICINE.

3. That the attention of the Dean of Medical Sciences at the University of Minnesota be called to the fact that teaching of therapeutics and prescription writing is inadequate, in the opinion of the committee, and that he be urged to make it adequate and worthy the reputation and standing of the University Medical School.

Nursing Shortage

Recommendations with regard to the nurses were less explicit. They point out, however, that a serious shortage of nurses actually exists in Minnesota at the present time and that it is to the interest of doctors, nurses and the public to study the situation carefully.

The following criticisms of the nursing situation today were brought by the committee to the attention of the delegates as requiring discussion and study. They may not be just or true but they are frequently heard and the committee believes that they require the joint attention of nurses and physicians. They are:

Problems for Discussion

1. That arbitrary rulings are made by nursing organizations and the Nursing Board on nursing hours and costs (without consulting either hospitals or doctors); on the number of nurses who may be educated in a given hospital and on the number of patients the hospital must have for educational purposes; on the physical equipment and sanitary standards for hospitals approved for registration.

2. That an attempt is being made to raise standards of education for nurses above the need for bedside nursing which, at the same time, will mean a scarcity of nursing and bring hardships on the public.

3. That attempts are being made to pass laws that will put the control of nursing education largely in the hands of lay people, that is, of people with no nursing or medical education, possibly through government subsidies to individual hospitals that are not state institutions.

The committee suggested that a thorough study be made of the law under which the Board of Nursing Examiners is operating to determine its present limitations and to suggest such modifications through the coöperative effort of hospitals, doctors and nurses as will cover present-day requirements.

Nurses and physicians who talked the matter over at the conference agreed that nurses who contemplate teaching or administrative work or specialization should by all means have extensive training. That ordinary bedside nursing does not require college degrees seemed to be agreed and also that the raising of requirements for these nurses is likely to raise costs to a prohibitive degree.

In this connection a subsequent talk given by Dr. George Earl, councilor for the first district, before the Hospital Association in St. Paul, is of interest.

Must Supply Demand

Dr. Earl said:

"Today there is a shortage of registered nurses for bedside duty, particularly for farm homes and in rural communities. Other factors besides the depression caused unemployment among nurses, first, and now a shortage.

"Previous to the unemployment, training schools had been very active both as to number and size of classes. Then came a period when many schools closed and the remainder reduced greatly the size of their classes.

Emergency

"To meet the resulting shortage which has now become an emergency, hospitals and others who are responsible for the care of the sick have turned to training women with less experience to take up some of the work formerly done by the graduate nurse.

"The economic situation naturally enters into the problem. Training schools must take the responsibility for providing a supply of nurses that will meet the demand. If they do not, others are certain to try to fill the needs."

New Constitution

The new constitution proposed for the first time at this meeting will be studied by all constituent societies during the coming year.

The old constitution called for a year to elapse between the first proposal and the final acceptance of a new one. In the meantime, the new constitution is required to be published in full twice in MINNESOTA MEDICINE and to be sent, also, to all county and district societies at least two months before final action. This routine will be duly followed and opportunity will be given for criticisms.

When final action is taken at the 1937 meeting, additional suggestions and alterations can be incorporated. The new document has been drawn up carefully in accordance with suggestions from Dr. W. E. Woodward, Chicago, Director of the Bureau of Legal Medicine of the American Medical Association, and with a view to the changing requirements of an active organization.

Speaker of the House

One of the major changes proposed by the new document is a Speaker of the House of

Delegates, patterned after the Speaker of the House of Delegates of the American Medical Association. This office will be filled each year though the incumbent will be eligible for re-election. The office is designed to relieve the president who has hitherto presided over the sessions of the House and generally to expedite the large amount of business before that assembly.

The desirability of such an office has been obvious for some time and, at the request of President W. W. Will, a temporary speaker was elected at the Rochester session, anticipating its permanent establishment. The office was given by unanimous vote to Dr. O. E. Locken of Crookston.

Use or Non-Use of the X-ray

Thirty years ago the use of the x-ray for diagnosis was unusual procedure. Today the only excuse for not using this important adjunct in treatment of fractures is the fact that both patient and doctor are far removed from a machine, or that suitable current required for the operation of a machine is not available.

Failure to use the x-ray machine if available, after he has undertaken to treat a patient, may be negligence on the part of the physician. The question is: "Did he exercise such reasonable care in determining whether or not to use the machine as is usually exercised by physicians in good standing under similar circumstances?"

The widespread use of the x-ray has influenced recent court decisions holding that the exercise of ordinary care and skill requires its use in both diagnosis and treatment. Therefore, your Medico-Legal Advisory Committee strongly recommends that x-rays be taken both before and after reduction of a fracture as well as frequently during healing and that the physician, if he deems it necessary, take a picture without request from the patient, even at his own expense. He cannot, of course, be held responsible if the patient refuses to have such picture taken. The committee further recommends that a written interpretation, signed by the interpreter, be filed as a part of the case record, such x-ray films to be considered a part of the hospital's or surgeon's permanent record, available at all times. Nurses and technicians should be told that they must not interpret films

to the patient, this being left to the surgeon in charge.

Ownership of Roentgenograms

A case is cited in the *Journal of the American Medical Association*, March 21, 1935, wherein the defendant company employed the plaintiff, a physician, to treat one of its employees who had sustained an injury to the lower part of the back involving the sacro-iliac joint. On the refusal of the company to pay for the services rendered, the plaintiff brought suit. A judgment was rendered in favor of the plaintiff, and the defendant appealed to the Supreme Court of Michigan.

The defendant declined to pay the bill because the plaintiff refused to deliver certain roentgenograms taken during the course of treatment. The Supreme Court held that the plaintiff was justified in thus refusing to surrender possession of the roentgenograms.

In the absence of agreement to the contrary, roentgenograms are the property of the physician who has made them incident to treating a patient, notwithstanding the fact that their cost is charged to the patient. Their retention by the physician constitutes an important part of his clinical record in the particular case, and, in the aggregate, roentgenograms may embody and preserve much of value incident to a physician's experience. They are as much a part of the history of the case as any other case record made by a physician. Roentgenograms differ little if at all from microscopic slides of tissue made in the course of diagnosing or treating a patient, and it would hardly be claimed that such slides were the property of the patient. Furthermore, continued the court, in the event of a malpractice suit against the physician, the roentgenograms that he has caused to be taken and preserved incident to treating the patient might often constitute the unimpeachable evidence which would fully justify the treatment of which the patient complained. In reaching its conclusion the court relied on the cases of "Corliss v. E. W. Walker Co. (C.C.), 64 F. 280, 31 L.R.A. 283," and "Pollard v. Photographic Company, 40 Ch. Div. 345," in which it was held that the negative of an ordinary photograph, in the absence of an agreement otherwise, belongs to the operating photographer although his use thereof may be restricted.

The judgment in favor of the physician was affirmed. McGarry v. J. A. Mercier Co. (Mich.), 262 N. W. 296.

MEDICO-LEGAL ADVISORY COMMITTEE.

"Medicine as a Business"

The following excerpts are from a recent address by Mr. J. G. Crownhart, secretary of the State Medical Society of Wisconsin, on "Your Practice and the Law."

This brief review of the accomplishments and the position of medicine should be read especially by those who are occasionally dazzled and lured

by the fine phrases and specious arguments of the social revolutionists in medicine.

They constitute a challenge to medical men who have now and then shown a readiness to sacrifice a great tradition and a great service to humanity for self interest.

Relation of Medicine to State Action

"... I am keenly conscious that it has been said that medicine has resisted community and state action in the field of health. Such statements can come only from the grossly misinformed or from those who have not taken the trouble to even glance at the record. I have given you but a part of the record in our own state tonight. Yet, surely, it is sufficient evidence to support the irrefutable assertion that, almost without exception, every law looking towards group action for the advancement of health and the alleviation of disease has come directly from the active individual practitioners of medicine of this state. . . .

"Without detracting from that which has been secured by other groups and professions, I must express the most earnest conviction that no group anywhere has so contributed to the welfare of the American people as have its physicians. . . .

Practitioners and Public Interest

"I am aware of the fact that throughout this discussion this evening I have repeatedly spoken of the public interest. I have done so intentionally for it has been my observation, as I am certain it has been yours, that the interests of practitioners of medicine and those of the public health are joint and indivisible, now and always. As you have benefited the public by your actions through these many years of your organization, so has risen the public respect and esteem for the profession. In times of depression, your financial reward, in common with others, has been cut and cut again but rarely indeed does the community fail to reward the practitioner who earnestly, devotedly and with progress, serves his people. . . .

"During these depression years as a means of promoting their own income there are, I know, those who would have us mark out the American people into real estate subdivisions with flags flying over so-called income groups to indicate what extent of medical service each group should receive and what they should pay for services from A to Z. Some would do this by legislation and others by voluntary insurance plans to insure that which actuaries cannot compute on an insurance basis—for a given group the incidence degree and kind of illness they may suffer and the costs thereof. Each such plan, bill and experiment that we have studied—and our files are full of such careful and comprehensive studies—each of these I say are held forth as being a cure-all because they will be cheap.

Medicine Not a Business

"Gentlemen, if we are to make cheapness the hall mark of medicine then we would return our people to the dark ages when life itself was cheap for no less than life itself is involved in medical service. . . .

"When you abandon present standards for fixed sum payments you enter upon a principle in the operation of which the physician profits most from performing the minimum service; a practice wherein the man who pays hard-earned money for months and years may find the institution that took his payments non-existent when he calls upon it in his time of need. . . .

"Medicine as a business would be more certain in its immediate financial rewards. Medicine if operated as a business would require certain numbers of patients in order that the machine of mass attention might function. Medicine in competition as business, aware of the difficulty of laymen judging poor service from good, would say through competing groups—'come to us and we will do more for less.' Medicine as a business would of course be concerned first with profits and payments in advance.

"You Care for All"

"But medicine as a profession, as it has been and is now practiced throughout the state of Wisconsin, will have none of this. You recognize that illness is peculiarly individualistic and is capable of no mass diagnostic or mass treatment methods. Almost within the month you have declared that it shall be cause for expulsion should any member use collection methods which involve borrowings at legal but high interest rates. Within the last five months you have publicly reaffirmed the age-old tradition of medicine—that you will care for all who seek your service and the cost will be within the means of each to meet. And a Harry Hopkins rises to declare that the service of medicine to the unemployed in these depression years 'is a grand story of service.' Medicine as a profession serves no master but the science and art of medicine and your utmost knowledge of both is brought to bear for the service of all.

No Subdivisions

"Finally you hold that in illness there can be no flags laying out the American people in subdivisions. You hold that the most costly medical service is that which devotes its attention to purchase price. No financial catastrophe is so great as that arising out of needless invalidism or too early death caused by substituting quantity service for quality. Progressive adequacy of medical care for the American people, already far in advance of other nations, has given to our industrial population in 1935 the lowest death rate ever recorded. Continued success lies in never surrendering to those forces which would make a poor business out of a truly great profession."

Exact Figures for Care of the Sick Poor

When physicians and members of county boards sit down together to determine upon a system of medical care for the indigent in their communities, the most important single fact to know is just what proportion of the county's budget for relief will be needed for care of the sick poor.

Until this year, this one pivotal fact has been a matter for guesswork and conjecture. It was one man's opinion against another, with the county officials occasionally suspecting the medical opinion of padding and physicians suspecting official opinion of stinginess and neglect.

Now, thanks to more than a year's experience with SERA and complete figures compiled for each county for 1935 by Mr. Zimmerman's staff, it is possible for both to speak with confidence of the needs of each county for future years.

The figures listed below give, not only the lump sum spent by SERA in each county, but the percentage it represented of the total relief budget for the county.

Thus, county officials can, with reasonable certainty, set aside a similar percentage of their budget for the ensuing year for payment of medical care. Physicians, on their part, will willingly adjust their compensation to the amount available based upon this percentage.

Every member is urged to study these figures for all counties as part of his own education in his responsibilities for care of the sick poor.

STATE RELIEF AGENCY

ANALYSIS OF MEDICAL & DENTAL OBLIGATIONS: 1935

County	Total Obligations Incurred	Average Case Load	Medical & Dental* Amount	Per cent	Medical & Dental Per Case
Aitkin	\$ 271,599	887	\$ 22,629	8.33	\$25.51
Anoka	315,204	690	18,236	5.79	26.43
Becker	251,122	873	7,976	3.18	9.14
Beltrami	304,533	1,037	11,547	3.79	11.14
Benton	275,388	567	7,411	2.69	13.07
Big Stone	574,195	739	25,525	4.45	34.54
Blue Earth	173,081	796	9,579	5.53	12.03
Brown	153,858	496	6,493	4.22	13.09
Carlton	198,087	627	10,543	5.32	16.81
Carver	80,600	283	4,734	5.87	16.73

*Not including hospitalization.

NOTE: Information concerning medical and dental care for the three urban counties, namely, Hennepin, Ramsey, and St. Louis, not reported to the State Office in form comparable with the rural counties.

Cass	284,082	1,120	6,252	2.20	5.58
Chippewa	490,099	925	33,486	6.83	36.20
Chisago	151,551	324	9,060	5.98	27.96
Clay	187,834	508	10,821	5.76	21.30
Clearwater	82,638	351	2,829	3.42	8.06
Cook	21,767	69	397	1.82	5.75
Cottonwood	98,623	183	2,377	2.41	12.99
Crow Wing	657,957	1,737	36,084	5.48	20.77
Dakota	422,737	1,008	16,518	3.91	16.39
Dodge	68,420	228	3,403	4.97	14.93
Douglas	368,947	608	26,714	7.24	43.94
Faribault	98,497	303	8,125	8.25	26.82
Fillmore	76,745	308	3,301	4.30	10.72
Freeborn	283,485	564	14,899	5.26	26.42
Goodhue	89,650	293	9,432	10.52	32.19
Grant	163,024	322	11,068	6.79	34.37
Houston	45,192	189	2,704	5.98	14.31
Hubbard	176,231	465	11,752	6.67	25.27
Isanti	155,826	199	4,940	3.17	24.82
Itasca	366,485	1,110	14,224	3.88	12.81
Jackson	43,864	204	2,387	5.44	11.70
Kanabec	196,820	527	13,685	6.95	25.97
Kandiyohi	476,565	750	18,287	3.84	24.38
Kittson	59,010	176	1,900	3.22	10.80
Koochiching	145,107	490	5,990	4.13	12.22
Lac qui Parle	373,842	619	17,365	4.65	28.05
Lake	38,452	168	2,516	6.54	14.98
Lake of the Woods	62,805	178	5,237	8.34	29.42
Le Sueur	68,674	254	2,278	3.32	8.97
Lincoln	295,544	348	6,798	2.30	19.53
Lyon	260,292	526	12,021	4.62	22.85
McLeod	155,118	449	9,140	5.89	20.36
Mahnomen	134,715	429	6,668	4.95	15.54
Marshall	84,483	258	6,885	8.15	26.69
Martin	46,125	283	9,010	19.57	27.88
Meeker	235,519	517	11,812	5.02	22.85
Mille Lacs	406,282	829	15,318	3.77	18.48
Morrison	458,176	993	13,910	3.04	14.01
Mower	114,303	472	13,156	11.51	27.87
Murray	112,961	158	2,106	1.86	13.33
Nicollet	66,623	205	3,561	5.35	17.37
Nobles	83,346	249	9,216	11.06	37.01
Norman	71,008	279	3,149	4.43	11.29
Olmted	590,833	1,171	41,593	7.04	35.52
Otter Tail	571,039	1,072	14,528	2.55	13.55
Pennington	53,633	236	2,700	5.03	11.44
Pine	260,513	629	10,489	4.03	16.68
Pipestone	140,017	262	3,205	2.29	12.23
Polk	216,172	606	9,181	4.25	15.15
Pope	382,464	636	24,165	6.32	38.00
Red Lake	17,225	72	2,125	12.34	29.51
Redwood	203,475	473	18,045	8.87	38.15
Renville	319,397	522	21,113	6.61	40.45
Rice	254,118	659	11,248	4.43	17.07
Rock	39,881	190	2,958	7.42	15.57
Roseau	94,144	269	6,194	6.58	23.03
Scott	25,641	139	1,339	5.22	9.63
Sherburne	131,904	209	5,760	4.37	27.56
Sibley	38,144	163	2,391	6.27	14.67
Stearns	1,132,117	2,328	35,611	3.15	15.30
Steele	45	..	..	..	..
Stevens	327,418	500	8,851	2.70	17.70
Swift	477,621	760	22,549	4.72	29.67
Todd	414,164	934	21,944	5.30	23.49
Traverse	268,016	283	10,545	3.93	37.26
Wabasha	79,306	323	4,009	5.06	12.41
Wadena	130,398	477	2,204	1.69	4.62
Waseca	110,356	285	4,800	4.35	16.84
Washington	350,194	832	14,536	4.15	17.47
Watsonwan	82,834	199	5,167	6.24	25.96
Wilkin	152,842	191	2,696	1.76	14.12
Winona	268,448	686	10,248	3.82	14.94
Wright	448,993	845	34,438	7.67	40.76
Yellow Medicine	409,356	523	9,270	2.26	17.72

Total Rural Co.'s \$18,867,841 40,950 \$909,356 4.82 \$22.21

Debate Finals

Final results of the high school debates on the question of state medicine are now available and they show a much better record for the negative than earlier returns promised.

Perhaps final appeals spurred physicians to a last minute effort to save the day. Perhaps the thanks go largely to the Women's Auxiliary whose special committee, headed by Mrs. Martin Nordland of Minneapolis, made a special request to members of the Auxiliary to help.

In any case, the final scores showed 38 victories for the affirmative among the regional contests and 32 victories for the negative.

Regional winners were Mankato and Coleraine, both of whose teams had debated on both sides of the subject.

It is interesting to note, however, that Mankato, defending the negative, carried off state honors. The complete list of debates and scores is now available and may be secured by writing to the State Office.

Minnesota State Board of Medical Examiners

Hibbing Quack Sentenced to One Year At Hard Labor

Re: State of Minnesota vs. Ramon L. De Silvio

On May 2, 1936, the Honorable Edward Freeman, Judge of the District Court for the Eleventh Judicial District, sentenced Ramon L. De Silvio to a term of one year at hard labor to be served at the St. Louis County Work Farm following a plea of guilty by the defendant to an information charging him with practicing healing without a Basic Science Certificate.

The defendant, a negro forty-five years of age, had treated a number of patients in Hibbing, Minnesota, and had collected various sums of money, ranging from \$2.50 to \$17.00 per patient. He had falsely represented himself as a

chemist and admitted in open court, when questioned by Judge Freeman, that he had only a sixth grade education. He also admitted that he had never studied medicine, pharmacy, chemistry nor any other sub-

ject dealing with the treatment of a sick person. He also admitted to the court that he had been arrested for a similar offense in Boston, Massachusetts. He remained silent when Judge Freeman told him that he could not cure the sick and that he knew it. The defendant had been in Hibbing about six weeks. Letters found on his person indicated that he had also lived at Rockford, Illinois.

The Supreme Court of Minnesota, thirty-one years ago, in a case from St. Louis County, stated in referring to the Medical Act:

"A just enforcement of that act would tend to prevent the most deplorable swindling of the ignorant poor, who can least afford to pay for the luxury of deception, and who are the most likely to be the dupes of ostensible practitioners, whose competency has not been determined by law, and whose moral deficiencies are evidenced by their false pretenses."

The Medical Board wishes to commend Judge Freeman for reaffirming the purpose of having medical laws and having them enforced. Other quacks have been given long sentences but this is the first time that a quack has been given the maximum of one year. The Medical Board also wishes to acknowledge the splendid coöperation given by Mr. John Naughtin, Assistant County Attorney of St. Louis County; Chester Naeseth, Chief of Police; Captain Munter, Sergeant Graves and Detective Phillips of the Hibbing Police Department.

St. Paul Quack Gets Jail Term For Second Offense

Re: State of Minnesota vs. George De Georgopoulos

George De Georgopoulos, fifty years of age, entered a plea of guilty to an information charging him with practicing healing without a basic science certificate before the Honorable C. M. Stockton, Judge of the Municipal Court, at Faribault, Minnesota, on May 16, 1936, and was sentenced to pay a fine of \$500.00 and costs, or serve six months in the Rice County jail. The defendant was unable to pay the fine and was placed in the County Jail to serve his sentence.



Geo. De Georgopoulos

The defendant had examined and treated a tuberculous patient at Faribault, Minnesota, and had received the sum of \$20.00 in cash. The patient and his family were on relief at the time. The defendant was arrested by the St. Paul Police Department following an investigation made by the State Board of Medical Examiners. In his room at the Euclid Hotel in St. Paul was found a trunk full of medicine and medical instruments. When arrested the defendant stated that he had a license, but produced instead two diplomas bearing the name Reliable Laboratories, St. Paul, Minnesota. One of the diplomas was in Hematology and Urinalysis and the other one in Physical Therapy. He stated that the school was operated by one Philip Stern in the Pittsburgh Build-

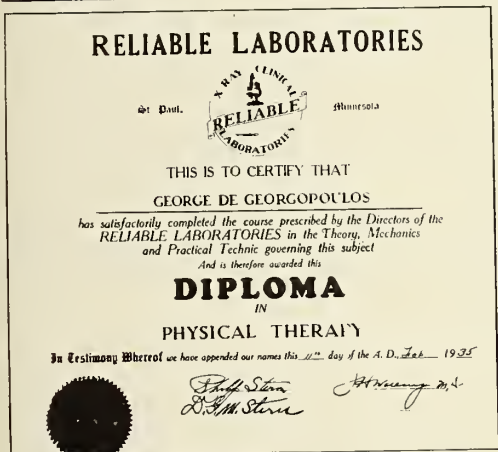
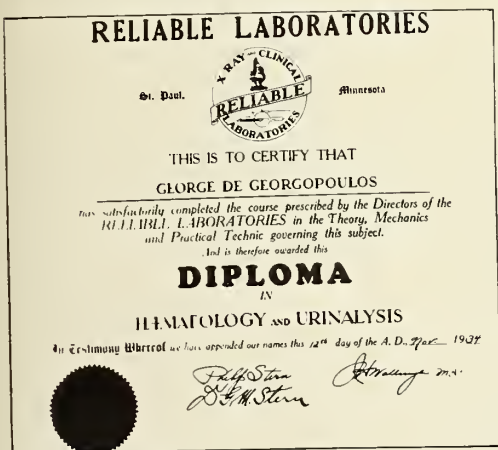


Ramon L. De Silvio

ing at Fifth and Wabasha Streets in St. Paul, and that he attended a course for two months to secure the diploma in Hematology and Urinalysis, for which he paid the sum of \$140.00. He stated that he went another month and received the diploma in Physical Therapy, for which he paid the sum of \$15.00.

The defendant admitted having had about twenty men patients at the Euclid Hotel who were examined and treated for various ailments. His specialty was

County. This investigation disclosed that C. A. Plath, a chiropractor from Armstrong, Iowa, and G. H. Alberts, another chiropractor from Mason City, Iowa, and one Theodore J. Hagen, a licensed chiropractor from Pelican Rapids, Minnesota, were attempting to hold a chiropractic clinic for the examination and diagnosis of patients at the Ceylon Hotel on May 11, 1936. The following advertisement was inserted in the Ceylon paper:



Facsimile of diplomas granted by the so-called Reliable Laboratories.

blood and skin examinations, and also examinations for gonorrhea. His charge varied from \$2.00 to \$10.00 per patient. The defendant also admitted receiving \$10.00 for treating a woman at Faribault for eczema. This defendant was arrested in 1929 in St. Paul charged with a similar offense, at which time he entered a plea of guilty and paid a fine of \$250.00. Subsequently he was denied citizenship in Federal Court because of his unlawful practice of medicine.

Medical Board Stops Unlicensed Chiropractic Clinic

Following a report to the Medical Board that two chiropractors from Iowa were going to hold a clinic at Ceylon, Minnesota, an investigation was made in co-operation with Sheriff Wm. L. Roehler, of Martin

**CHIROPRACTIC RESEARCH
CLINIC**

Part of an educational program sponsored by the Chiropractic Research Society, will be held in Ceylon

MONDAY & TUESDAY, MAY 11 & 12

Consultation will be held and analysis and examination made by members of the Chiropractic Research Staff.

No charge will be made for consultation and analysis. Where X-ray is desired a minimum fee will be asked to cover costs.

Latest Chiropractic technique and equipment will be used, including X-ray and Neurocalometer.

As only a limited number can be accommodated in the two days, appointment should be made—Phone 55.

Those taking advantage of this opportunity and wishing further health service will be referred to

**DR. C. A. PLATH
ARMSTRONG, IOWA**

A postal card containing the following notice was placed in each mail box at Ceylon:

MONDAY AND TUESDAY, MAY 11th and 12th, are the dates of the Chiropractic Clinic, to be held at the Ceylon Hotel, Ceylon, Minn.

Dr. G. H. Alberts of Mason City, Iowa, and Dr. Theo. J. Hagen of the Park Region Health Home of Pelican Rapids, Minn., both members of the Research Clinic Staff, will be in charge of the Clinic. Latest Chiropractic technique and equipment will be used, including X-ray and neurocalometer.

Fail not to take advantage of this health educational service. Find out what may be the cause of your ailment and what chiropractic can do for you. There will be no charge for consultation and analysis, except where X-ray is found necessary.

The Ceylon Hotel management is in charge of local arrangements, and anyone wishing to take advantage of this free offer to consult one or both members of this Clinic Staff should make an appointment as soon as possible at the hotel, or phone 55 to avoid disappointment, as only a limited number can be accommodated in two days.

Following a discussion of the matter in the office of C. L. Erickson, County Attorney of Martin County, a warning was given to Plath and Alberts and they were permitted to return at once to the State of Iowa. These two men are not registered under the Basic Science Law of Minnesota, and have no license to practice healing of any kind in this State, consequently they have no lawful right to practice. Any further violation of the law will result in a prosecution. During the questioning of these men it developed that Alberts had conducted a similar clinic at Spring Valley, Minnesota, last fall. The Medical Board respectfully solicits the coöperation of every member of the medical profession to inform the Board promptly when advertisements similar to the above appear at any time in this State.

OBITUARY

George E. Brown*
1886-1936

We mourn the loss of Dr. George E. Brown. The younger men probably feel this loss most keenly for he was especially their friend and inspired them to clinical investigation.

After graduation, internship, and his marriage to Miss Irma Parker, Dr. Brown settled in Miles City, Montana, where he remained in practice for ten years. During those years he was not content with mere routine but introduced laboratory procedures rarely used in general practice, brought the first fluoroscope to his part of Montana, and began to publish his observations.

In 1921 Dr. Brown became first assistant in a section of the Division of Medicine of The Mayo Clinic. His progress was rapid; he advanced to associate in medicine and to the headship of a section, and later became associate professor of medicine in the post-graduate school. His position on the staff of this institution gave him a better opportunity to develop his bent toward clinical investigation and to apply scientific methods in the diagnosis and practice of medicine.

Dr. Brown's contributions to medical literature began in 1911. From then onward papers and monographs were produced by him and his associates in rapid succession. Reports of approximately a hundred and fifty studies bear his name. In the early years of his career these studies ranged over a wide field of internal medicine but by 1922 his interest in the little known field of blood vascular disease was evident. His contributions to this field in the next thirteen years were of inestimable importance. His mind was literally seething with projects to increase knowledge of this aspect of medicine.

Dr. Brown was a member of many important medical societies. He was active in the scientific work of the Minnesota State Medical Association. He was especially interested in perfecting the organization of the American College of Physicians. He was one of the original committee which initiated the Central Society for Clinical Research and was a member of such honorable bodies as the American Society for Clinical Investigation and the Association of American Physicians.

Dr. Brown was a man of brilliant mind and admirable social qualities; cheerful, confident, tolerant, frank, hospitable, an excellent teacher, and especially a friend of the younger men.

Dr. Brown died young; he was only fifty years of age. We do not know what important discovery may have died with him. Fortunately for medicine

and for the public, however, whatever he knew or suspected he imparted to his associates; therefore, much of his work did not die with him. To Mrs. Brown, to George, Jr., and to Hugh, the members of the Minnesota State Medical Association can say sincerely that they miss him deeply and shall always remember him as a benign influence and an inspiration.

O. A. Oredson
1872-1935

Dr. Oredson of Duluth was born at St. James, Minnesota, in 1872. He studied at Gustavus Adolphus College; later taught school, and for a time was employed as a commercial traveler. He commenced the study of medicine at the University of Iowa, taking his final degrees at Hamline, and his internship at the Bethesda Hospital, St. Paul. He commenced practice in Duluth in 1904 at the age of twenty-eight.

In 1913, Dr. Oredson visited Vienna, and spent some time with Lorenz; from thence to Berlin where he was studying with Bohn when the war commenced. At this juncture he made himself exceedingly useful in assisting American and British visitors in their hurried exodus from Germany. Dr. Oredson was trilingual, a valuable asset which few American doctors can lay claim to, and this gave him an excellent opportunity in the emergency of August, 1914. Then after leaving Berlin the doctor spent some time with Lane in London, returning to Duluth to specialize in surgery and gynecology. He died in Duluth, November 25, 1935, after suffering for a year or two from a cardiac disability.

Aside from his practice Dr. Oredson enjoyed hunting and his home, his books, his dogs and garden. He wrote a play which enjoyed an amateur presentation, and several poems of merit.

His father died when he was a small boy. The family was large and their means limited; and so working his way slowly through college and medical school he lived a somewhat broader life than the average medical man is privileged to enjoy.

Henrik K. E. Nissen.
1864-1936

Dr. Henrik Nissen was born in Norway and graduated from the medical school of the Royal University of Oslo. In 1889 he came to the United States and practiced at La Crosse, Wisconsin, and for a time at Albert Lea, Minnesota. He then returned to Europe to study in Vienna and Berlin before coming to Minneapolis, where he had practiced his specialty of eye, ear, nose and throat diseases since 1904.

Dr. Nissen was a member of the Minnesota State Board of Health for two terms, beginning in 1894. As a hobby he studied geology and a year ago published a geological treatise entitled "The Origin of the Moon," which attracted much favorable mention on the part of scientists.

Dr. Nissen died at the age of seventy-two on May 7,

*A tribute to Dr. George E. Brown presented before the general assembly of the Minnesota State Association on Wednesday, May 6, 1936, by Dr. H. Z. Giffin, as Councilor of the First District.

1936. He had lived in Minneapolis since 1904, and had a summer home on Rainy Lake at Fort Frances, Ontario. He was a member of the Hennepin County Medical Society, Minnesota State and American Medical Associations until 1927, when he resigned. He is survived by his wife; four daughters, the Misses Dagny and Elizabeth Nissen of Minneapolis, and Mrs. Carl Francis and Mrs. Robert Burgess, both of New York; and two sons, Henrik E. of Minneapolis and Arvid of Philadelphia.

George R. Duncan
1903-1936

George R. Duncan was born in Saint Paul, September 18, 1903. After graduating from Mechanic Arts High School in Saint Paul in 1919, he attended Dartmouth College for two years before entering the University of Minnesota Medical School, where he received his medical degree in 1927.

After serving his internship at the San Francisco city and county hospital, Dr. Duncan went to Glen Lake Sanatorium, where he was a member of the medical staff at the time of his death, April 6, 1936.

While at Glen Lake, Dr. Duncan carried on research work in the fever treatment of tuberculosis and presented his findings before the National Tuberculosis Association and other medical groups.

A member of the Phi Beta Pi medical fraternity, he was also a member of the Minnesota Trudeau Society, the Hennepin County Medical Society, Minnesota State and American Medical Association.

Dr. Duncan is survived by his wife and daughter, Elizabeth Jane; by his parents, Mr. and Mrs. Charles H. Duncan; and a sister, Jean Duncan of Saint Paul.

H. C. Jenckes
1853-1936

Dr. H. D. Jenckes, Pipestone, died at his home May 18, 1936, at the age of eighty-three.

Dr. Jenckes was born in New York state. He came as a boy to the middle west, where his family settled in Wisconsin.

After graduating from the Physicians and Surgeons College at Chicago, Dr. Jenckes served for a time as superintendent of the St. Anthony Hospital, Minneapolis, an institution now out of existence. From Minneapolis he moved to Jasper, where he held public offices for a time.

A resident of Pipestone for about thirty-five years, Dr. Jenckes served for a time as health officer of Pipestone County. He also was superintendent of the Indian hospital there and physician at the Indian school for several years.

Dr. Jenckes is survived by his widow and a son, Earle D. Jenckes of Saint Paul; a brother, Walter Jenckes of Freeport, Illinois; and a sister, Mrs. Len Colvin of Marshfield, Wisconsin.

OF GENERAL INTEREST

Dr. Frederick A. Engstrom of Wanamingo, Minnesota, is chairman of the Goodhue County Democratic Committee.

* * *

Dr. and Mrs. W. H. Rumpf of Faribault sailed May 2 from New York for a four months' vacation in England.

* * *

Dr. J. T. Christison of Saint Paul has been named grand viceroy of the Red Cross of Constantine, the world's oldest Masonic organization.

* * *

Dr. O. E. Sarff has resigned his position as head of the hospital at Buhl, Minnesota, and is now located in Virginia, Minnesota, where he is engaged in private practice.

* * *

Dr. A. F. Branton of Willmar assumed his duties as president of the Minnesota Hospital Association following the annual meeting of the Association in Saint Paul May 14 and 15.

* * *

Dr. A. M. Aanes of Red Wing was re-elected for a term of five years to the Board of Directors of the North American Life and Casualty Company at a meeting held in May at the company offices in Minneapolis.

* * *

Dr. A. W. Shaleen of Hallock, Minnesota, was recently appointed physician in charge of the Bronson Work Camp, near Hallock. Dr. F. F. Stocking of Hallock will take care of any necessary surgical work at the camp.

* * *

Announcement has been made of the engagement of Miss Naomi Aubin, daughter of Dr. and Mrs. Alexander Aubin of Minneapolis, to Dr. Joseph B. Gaida of St. Cloud. The wedding will take place late in the summer.

* * *

Dr. S. A. Slater of Worthington was re-elected to serve another two-year term on the Board of Directors of the National Tuberculosis Association at the annual meeting held in New Orleans the latter part of April.

* * *

Dr. and Mrs. C. Gordon Watson of the Soudan Hospital, Soudan, Minnesota, have returned from Europe, where Dr. Watson took a postgraduate course in surgery at Vienna. Dr. and Mrs. Watson visited several countries on the Continent before returning to the United States.

Dr. P. C. Pilon of Paynesville, Minnesota, was honored recently at a testimonial dinner given on the completion of half a century of active service as a physician. Dr. Pilon was graduated from medical college in Victoria, B. C., May 12, 1886, and came to Cold Springs, Minnesota, the following year. He later practiced at Richmond and came to Paynesville in 1897.

* * *

Dr. E. E. Novak of New Prague, Minnesota, candidate for the Democratic gubernatorial nomination, was recently honored at a testimonial dinner by citizens of New Prague. Dr. Novak was characterized as an "outstanding physician, educator, conservationist, agriculturist, community builder and good citizen" in the tribute paid to him at that time.

* * *

Dr. J. R. Kingston of Deer River recently returned from a tour of inspection of public health work in Michigan and has taken over his duties as director of public health for the northern Minnesota district, an appointment which he received from the State Board of Health in April. Dr. Kingston's headquarters will be in Grand Rapids, Minnesota, but he will continue to keep his offices at Deer River with the assistance in this practice of another doctor.

* * *

Dr. Arrah B. Evarts, who retired June 1 from the staff of the Rochester State Hospital, where she has been senior assistant physician, was honored at an entertainment given May 15 by the employees of the hospital, who presented her with a gift of silver. Dr. Evarts joined the staff of the Rochester State Hospital in 1918. Previous to that time she had served six years as a member of the staff of St. Elizabeth's Hospital, District of Columbia. She is a native of Minnesota, having been born at Dodge Center and received her medical degree from Hamline University in Saint Paul. Dr. Evarts will continue to live in Rochester, where she has a home just west of the city.

* * *

Following a period of service of forty-three years at the University of Minnesota, Dr. Charles A. Erdmann, instructor of anatomy at the University of Minnesota medical school, will retire at the end of the present school year, June 30. Dr. Erdmann is known to thousands of alumni and medical students at the University and for the past few years has enjoyed teaching the sons of some of his earlier students. In a recent newspaper interview he stated that medical students have changed but little in forty-three years: "The type of man the profession attracts is always the same, a good student, not necessarily a brilliant one, but a person imbued with the ideals of service to mankind. It has always been the same."

Clinical Pathologic Seminar

(Continued from page 381)

sisted for about twenty years. The antisyphilitic treatment which the patient received apparently did not delay the progress of the disease but no antisyphilitic treatment was given during the first eighteen years of its course. Syphilitic aortitis with involvement of the aortic valve is one of the most frequent causes of death in syphilitic patients.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for June

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 9:45 A. M. every Tuesday over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

- June 2—Clothing and Health
- June 9—The Liver Treatment of Anemia
- June 16—The Expectant Mother
- June 23—Adult Education
- June 30—Carbohydrate and Dental Caries

Medical Library Association

The Ramsey County Medical Society, Saint Paul, will be host to the Medical Library Association at its annual meeting June 22 and 23, 1936.

Librarians from all over the United States and Canada will attend. Physicians are invited to attend the sessions. On Monday, June 22, Dr. W. W. Francis, from the Osler Library of McGill University, will be the speaker, and on Sunday, June 21, Dr. and Mrs. W. H. Van der Weyer will entertain the visitors informally at Grey Cloud Island.

Northwestern Pediatric Society

The annual meeting of the Northwestern Pediatric Society was held at the University Club, St. Paul, on May 7, 1936. The following officers were elected: Dr. A. V. Stoesser, Minneapolis, President; Dr. R. L. Wilder, Minneapolis, Vice President; and Dr. Roger L. F. Kennedy, Rochester, Secretary-Treasurer. The guest speaker, Dr. Thomas B. Cooley of Detroit, gave a most interesting presentation on "Constitutional Hemolytic Anemias."

Minnesota Radiological Society

The annual meeting of the Minnesota Radiological Society was held in connection with the meeting of the Minnesota State Medical Association at Rochester, Minnesota, May 4, 1936.

The Russell D. Carman Memorial Lecture was delivered by Dr. Willis F. Manges of Philadelphia on the subject, "Foreign Bodies and the Use of X-Ray Examination in Their Localization and Removal."

At the annual dinner Dr. Manges addressed the members of the Society on "The Future of Radiology."

Election of officers for the coming year resulted as

follows: President, Dr. J. Richards Aurelius, St. Paul; Vice-President, Dr. Walter H. Ude, Minneapolis; Secretary-Treasurer, Dr. Leo G. Rigler, Minneapolis.

LEO G. RIGLER, M.D., *Secretary*.

Dinner to Honor Nine Distinguished Servants of the Medical School

On the evening of Wednesday, June 10, at 6:30 p. m., a formal dinner will be held in the ballroom of the Minnesota Union to honor nine men of the teaching faculty of the Medical School of the University of Minnesota who will retire from active teaching at the end of the current year:

Dr. James T. Christison	Dr. Charles H. Mayo
Dr. Charles A. Erdmann	Dr. John T. Rogers
Dr. James S. Gilfillan	Dr. John L. Rothrock
Dr. Thomas B. Hartzell	Dr. Franklin R. Wright
Dean E. P. Lyon	

On this occasion also, a portrait of Dean Lyon, a gift of the heads of the departments and directors of the divisions, will be presented to the Medical School of the University.

Anyone who would like to attend is cordially invited. Wives are also included in this invitation. The cost of the dinner is \$2.00 per plate. Those interested in coming should notify Dr. J. C. Litzenberg's office at the University, at their earliest convenience. Reservations can not be assured after June 6.

THE COMMITTEE ON ARRANGEMENTS.

Hennepin County Society

Dr. Jalmar H. Simons was named president of the Hennepin County Medical Society at the annual meeting held May 4, and will take office at the society's annual meeting in October. Dr. F. G. Benn, newly-elected first vice president, will be in charge of arranging the scientific programs of the society when these are resumed in the autumn.

Other new officers are: Dr. C. E. Proshek, second vice president; Dr. W. H. Aurand and Dr. C. J. Ehrenberg, executive committee; Dr. D. P. Head and Dr. O. W. Yoerg, board of censors; Dr. F. A. Erb and Dr. R. T. La Vake, board of trustees; and Dr. Martin Nordland and Dr. J. S. Reynolds, ethics committee.

Delegates to the 1937 convention of the Minnesota State Medical Association include Dr. A. E. Cardle, Dr. Gilbert Cottam, and Dr. O. S. Wyatt, with Dr. R. H. Creighton, Dr. Martin Nordland and Dr. A. A. Wohlrahe as alternates.

Red River Valley Society

Fifty physicians from the Red River Valley assembled in Crookston April 28, 1936, for the annual dinner meeting of the Red River Valley Medical Society, which was held at the Red and Gold room of the Hotel Crookston.

Wives of the physicians joined them for the dinner

and later went to the J. F. Norman residence for a business session and an informal evening of bridge.

The physicians heard an address by Dr. William T. Peyton of the University of Minnesota school of medicine on "Tumor of the Breast." The address was illustrated by stereopticon slides. Physicians were present from Ada, Fosston, Oslo, Thief River Falls, Red Lake Falls, Warren, and other towns north to the Canadian border, and east of Crookston.

The Women's Auxiliary of the society held a business session at which Mrs. Norman was elected president; Mrs. C. W. Froats of Thief River Falls, first vice president; Mrs. C. H. Holmstrum of Warren, second vice president; Mrs. W. G. Paradis of Crookston, secretary; Mrs. G. A. Morley of Crookston, treasurer; and Mrs. W. J. Wiltout of Osseo, corresponding secretary.

Upper Mississippi and St. Louis County Societies

A joint meeting of the Upper Mississippi Medical Society and the St. Louis County Medical Society was held Saturday afternoon and evening, April 25, at the armory at Aitkin, where a banquet was served following the meeting. The doctors and wives of Brainerd attended, also Dr. and Mrs. A. B. Rosenfield of Pequot.

The Women's Auxiliary met at the same time with Mrs. B. A. Smith, Crosby, as president, and Mrs. J. P. Hawkinson, Crosby, as secretary. Mrs. E. G. Hubin of Deerwood is treasurer. The group met at the home of Mrs. B. W. Kelly for the evening entertainment.

Minnesota Hospital Association

Those who attended the Minnesota Hospital Association convention at the Lowry Hotel, Saint Paul, May 14 and 15, unanimously agree that it was one of the most outstanding conventions in the history of the state Association, from the standpoint of number in attendance (412 registrations) and for the excellent papers submitted.

The Minnesota Record Librarians Association, The Minnesota Dietetic Association, The Minnesota Anesthetists Association, The Minnesota Association of Social Workers and the Superintendents of Hospital Nurses' Training Schools met simultaneously interlocking their programs with the hospital conference.

Mr. Victor Anderson, president of the Association, opened the convention with a request for reports of the standing and special committees.

The Nominating Committee presented the following officers:

President-Elect—Sister M. Patricia, O.S.B., Supt., St. Mary's Hospital, Duluth
 First Vice President—Peter D. Ward, M.D., Supt., Chas. T. Miller Hospital, St. Paul
 Second Vice President—H. A. Burns, M.D., Supt., State Sanatorium, Ah-Gwah-Ching
 Treasurer—Ray Amberg, Supt., University Hospital, Minneapolis
 Trustees (for 2 years)—A. G. Stasel, Supt., Eitel Hospital, Minneapolis; S. R. Lee, M.D., Supt., Ancker Hospital, Saint Paul
 Joseph G. Norby, Supt., Fairview Hospital, Minneapolis, to fill unexpired term of Dr. Peter Ward for one year.
 Mr. J. J. Drummond, Mgr., Worrall Hospital, Rochester, is the other trustee whose term expires in 1937.

No other nominations being made, the secretary was requested to cast the ballot and the above named officers were elected.

Dr. A. F. Branton of Willmar, elected to the office of president-elect last year, will assume the duties of president, and Mr. Arthur M. Calvin will continue as secretary.

The *Constitution and Rules Committee* submitted a recommendation to incorporate the Minnesota Hospital Association, which was voted upon and unanimously accepted.

The report of the *Insurance Committee* gave a brief résumé of the insurance requirements of hospitals.

The report of the *Membership Committee* showed that our membership totaled 167.

The *Nursing Committee* report provided information as to the requirements now imposed upon hospital nursing training schools.

The *Public Relations Committee* gave a very interesting report of the year's activities. During National Hospital Day week over sixteen broadcasts were given on radio stations, publicity in the newspapers was given daily and all hospitals were coöperating in holding open house on National Hospital Day with special types of services and clinics. Special memorial services were held in memory of Mathew Foley, the founder of National Hospital Day.

One of the chief subjects which caused much concern was that of the present emergency of a shortage of nurses and the program of increasing the educational standards of nursing education.

Business Section:

It was recommended to the Convention that the 1938 meetings of the American Hospital Association and allied associations that meet simultaneously with the American Hospital Association be invited to hold their convention in St. Paul.

The Committee submitted also the following resolutions:

"WHEREAS the members of the Minnesota Hospital Association duly assembled in Duluth, Minnesota, May 23 and 24, 1935,

"AND WHEREAS it was deemed advisable at such convention that the Association incorporate under the laws of the State of Minnesota applicable to such an association,

"BE IT THEREFORE RESOLVED by the members of the Minnesota Hospital Association duly assembled in the City of St. Paul May 14 and 15, 1936, that the Articles of Incorporation which have been duly prepared by the Committee for this purpose be and are hereby accepted and approved by this convention and that it be the instruction of the convention that the officers of the Minnesota Hospital Association proceed immediately with the incorporation." The resolution was adopted by unanimous vote.

"RESOLVED, that the Minnesota Hospital Association favors the efforts to secure legislation setting aside a portion of the gasoline or license tax money to be available for highway accident cases served in our Hospitals."

"RESOLVED, that the Minnesota Hospital Association favors legislation licensing hospitals and the setting of standards on the basis of the outline as prepared by the Minnesota Medical Association."

"RESOLVED, that the Minnesota Hospital Association approve the continuance of the policy of employing a paid representative during legislative sessions."

"RESOLVED, that the Committee on Publications be instructed to make available to the membership the excellent committee reports and papers."

"RESOLVED, that the policy of holding joint meetings with the allied professions is highly approved and should be extended further."

"RESOLVED, the Minnesota Hospital Association expresses its appreciation to our distinguished guests, Dr. Robert Buerki, Dr. Malcolm T. MacEachern, Miss E. Muriel Anscombe, Dr. F. G. Carter, Dr. Caldwell, and Mr. Paul Fesler."

"RESOLVED, that the Minnesota Hospital Association express its appreciation to the Lowry and Saint Paul Hotels for the excellent care given the membership."

"RESOLVED, that the Minnesota Hospital Association express to the citizens of St. Paul and to His Honor, Mayor Gehan, its appreciation of their generous hospitality, and to the press for its coöperation."

"FINALLY, BE IT RESOLVED, that the Minnesota Hospital Association express to the officers and various committees its appreciation of their efforts which have made this 1936 meeting one of the best."

A motion was made and carried that the Economics Committee provide a study of the per capita cost per

day of hospitals, also personnel practices and procedures (such as salaries, vacation leave, et cetera).

It was moved, seconded and carried that the association issue a monthly publication to be named "The Minnesota Hospitals" and that the publication committee be instructed to proceed with same and that all details relative to its publication, advertising and similar responsibilities, in addition to whether the publication should be published twelve times or nine times annually be left with this committee.

A motion was made and carried that the 1937 convention of the Minnesota Hospital Association be held in Rochester.

The following committees were instructed to include in the next year's reports as follows:

Insurance Committee to include malpractice and coöperate with the medical society relative to the reducing of malpractice insurance rates.

Publication Committee to include a nine or twelve month bulletin, the back page to be given over to advertising.

Legislative Committee to proceed with legislation on licensing of hospitals; also to secure legislation if possible in regard to securing funds from the gas and auto license tax to pay for indigent individuals who have received injuries through automobile accidents and thereby distribute the funds to hospitals in proportion to the amount of service rendered to these cases.

Public Relations Committee was instructed to provide for more frequent radio talks during the year.

Saturday morning was given over to a golf tournament. Prizes were provided by the Physicians and Hospitals Supply Company and Brown and Day, Inc. The three low scores and those receiving prizes were as follows:

Arthur M. Calvin, St. Paul, with low score, total 82.

H. J. Mitchell, Rochester, second, total 83.

Dr. Peter D. Ward, St. Paul, third, total 86.

The high winds which provided a continuous gale over White Bear Lake provided a most difficult day in which to play.

Those partaking in the tournament voted unanimously to invite the women golfers from the hospitals of the state of Minnesota to participate in the next golf tournament, the past tournaments having received no competition among the women golfers.

Trichloroethylene in Angina Pectoris

A report appearing in the Associated Press news, December 30, 1935, contained the following statements:

"Instantaneous relief for the pain of angina pectoris and complete cure for most sufferers from the disease was claimed today by Dr. John C. Krantz, Jr., of the University of Maryland in a report which he read to the American Association for the Advancement of Science. The cure, he said, is a drug called trichloroethylene, one cubic centimeter of which is snuffed into the nose when the pains and heart compression of angina pectoris begin. It gives relief within one second."

An inquiry was sent to John C. Krantz, Jr., Ph.D., professor of pharmacology at the University of Maryland School of Medicine. Dr. Krantz replied as follows:

"My associates and I reported at the Section of Medical Sciences of the American Association for the Advancement of Science the mechanism of the action of trichloroethylene in the treatment of angina pectoris, which was studied clinically in the institution of Dr. William Love, Jr."

"It is unfortunate that the Associated Press misinterpreted the presentation and stated that we had discovered a cure for the disease. Dr. Love's patients were relieved in most cases from the distress and apprehension of angina pectoris by the inhalation of 1 c.c. of the drug, morning and evening. I shall be pleased if you will emphasize, to those who inquire from you, the fact that we have not discovered a cure for angina pectoris."

It may be pointed out that trichloroethylene is a drug to be prescribed with caution. (J. A. M. A., February 8, 1936, p. 485.)

TRANSACTIONS of the MINNEAPOLIS SURGICAL SOCIETY

Meeting of March 5, 1936

The President, DR. F. A. OLSON, in the Chair

THE regular monthly meeting of the Minneapolis Surgical Society was held in the lounge of the Hennepin County Medical Society rooms on March 5, 1936. The meeting was called to order by the President, Dr. F. A. Olson, at 8:00 p. m. There were forty-two members present.

The following scientific program was presented:

LYMPHO-EPITHELIOMA

WILLIAM T. PEYTON, M.D.
Minneapolis

It is possible that there is no such entity as "lympho-epithelioma." After reviewing some of the literature prior to 1928 on lymphoepithelioma, New and Kirch⁵ dismiss the whole question of there being such an entity as "lymphoepithelioma" by the statement that these tumors are classified by Broders as grade IV squamous cell carcinoma. Ewing,² in 1928, calls them transitional cell carcinoma, which he apparently considers the same as the so-called "lymphoepithelioma." Cutler,¹ in 1929, recognized two types of lesions: (1) transitional cell carcinoma in which there were no lymphocytes; and (2) lymphoepithelioma in which there are syncytial masses with rich infiltration of lymphocytes. The latter is more rare.

The term "lymphoepithelioma" was applied to these tumors in 1921 by Schmincke⁷ and Regaud.⁶ The name is derived from the term "lymphoepithelial tissue" which was used by Jolly³ in 1911 to designate the mucous membrane in which lymphoid tissue is developed, such as the tonsils. That certain tumors of the pharynx have peculiar clinical manifestations was noted by New⁴ in 1921.

Regardless of the term by which these tumors are designated, it is of the greatest practical importance that they have specific clinical features. In brief these are: (1) enlarged cervical lymph nodes with small or often non-demonstrable primary lesion at the time they are first seen, this primary lesion appearing in a recognized form many months later; (2) symptoms referable to the ear, such as deafness, pain, or tinnitus aurium; (3) pain over the distribution of the fifth nerve; (4) other cranial nerve involvement, especially paralysis of the ocular muscles.

The most frequent site of the primary lesion is in the region of Waldeyer's tonsillar ring, being most frequent in the palatine tonsils. The second most frequent site is in the lateral wall of the pharynx. The primary lesion is frequently non-ulcerated until late in the disease. Distant metastases occur, especially in the retroperitoneal lymph nodes. Cases are reported in which metastases occurred to the liver and to the bones.

These tumors are very radio-sensitive, and if adequately treated before wide dissemination has occurred a good prognosis for permanent cure is offered.

Twenty-two cases of this type of lesion from the University Hospital records are reported; twenty-one of these diagnoses were made by biopsy, and one was a clinical diagnosis. The duration of symptoms from onset to treatment was 9.5 months; the shortest, 1.5 months; the longest, 60 months. Eight patients are still living; fourteen are dead. The site of the primary lesion was in the tonsil in fifteen cases, in the pharynx in four, in the lingual tonsil in two, and in one case the pharynx, tonsil, and tongue were so diffusely involved that it was impossible to determine the exact site of the primary lesion. Seventeen (77 per cent) had metastasis when admitted; five of these are still living. Five (23 per cent) did not have demonstrable metastasis when admitted; three of these are living.

X-ray therapy alone was used in the treatment of fifteen cases, radium alone in the treatment of one case, and both x-ray and radium was used in six cases. These patients were treated too recently to be of much value in determining the final results of treatment in this type of tumor. The longest survival without recurrence in this group is four years.

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Discussion

DR. ARNOLD SCHWYZER: I think I saw one of these patients, but we did not make the diagnosis of this special form of carcinoma. There was an enormous tumor coming down from the nasopharynx and invading the posterior pharyngeal wall. The man was brought to the office. He was choking, he was blue and could hardly get any air. He was sent to the hospital in a hurry.

When he was in the operating room I tried to look into his throat, but he choked completely, became unconscious and was dying. At the last moment we made a tracheotomy. It was a very soft tumor that pushed the soft palate forward; nevertheless the uvula could not be seen. The mass was large and bled when manipulated but was not ulcerated. It reached clear up to the base of the skull. We did the only thing to do, packed the entrance to the glottis, then with two fingers in the mouth peeled the whole mass out and then packed the pharynx tightly with a large piece of gauze. This checked the bleeding very well. After a number of minutes this gauze was replaced by one which enclosed 50 mgr. of radium. All this was done on the unconscious patient. There was neither time nor need of an anesthetic. The patient gradually came

to again and recovered. He was well one and a half years later. He came to the office to have his wife examined, but refused to be examined himself, declaring he was well. He seemed all right and was breathing well. There were no metastases. Later on, I am told, he had a recurrence. He went to his doctor, who used injections of some kind. The patient died about two and a half years after the operation. I was surprised how well the radium had seemed to work.

CARCINOMA OF THE STOMACH

ARNOLD SCHWYZER, M.D.

(by invitation)

Saint Paul

When we read in a recent statistical study (Am. Jour. Surg., Feb., 1936) that annually there are in the United States approximately forty thousand deaths from cancer of the stomach, and remembering that early recognition and competent surgery offer at present the only hope for the patient, we all are surely impressed by this enormous responsibility. It should, therefore, be repeated again and again that any patient, and particularly if he be in the neighborhood of, or over, fifty years of age, must be carefully investigated if he comes with stomach complaint of more than ephemeral character. Dr. Lahey's statement before you a month ago that every such patient who shows no marked signs of improvement after a week's medical care should have an x-ray study without delay cannot be too heartily emphasized.

Ulcer patients have very often a long history of complaints with intervals of considerable relief. Patients with cancer give more often a history of a rather recent start of the symptoms with a more steady and increasing discomfort. An indolent patient may make little of the early symptoms. This is one of the causes of fatal delay on the part of the patient especially in those cases where the inlet and outlet of the stomach are not early affected. At times we might be misled by a positive statement of the patient that his troubles began with some acute transitory disturbance, febrile or intestinal or after eating a certain food.

One often hears that the ulcer patient is afraid to eat while the cancer patient can't eat. However, there are exceptions. I well remember an instance in my early days of practice. A fifty year old German with an enormous heart, cyanosis and extreme dropsy knew he was going to die. He expressed the wish to get a bottle of beer with a good portion of Limburger cheese and rye bread, which I procured for him. "That was a real feast" he told me the following morning and was still enjoying the memory of it. A week later he died and at autopsy we found to our surprise besides the cor bovinum with its secondary lesions an advanced carcinoma of the stomach. With this story I am trying to emphasize the frequent unreliability of the symptoms and history. The insidious feature is that early carcinoma of the stomach per se does not give any symptoms, and that it reveals itself only by some secondary signs such as bleeding, obstruction, inflammation, and so forth, which are not early features. Let us, therefore, not lose much time over a discussion of the history beyond the few points mentioned before.

The previously stated demand that any patient in the cancer age whose gastric distress is not much relieved within a week's time should be subjected to an x-ray examination should be supplemented by the demand that the examination be made by an *experienced* roentgenologist. But even this statement gives no sufficient security against a sad error. We cannot rely much on the cancer age. Carcinoma of the stomach does not occur so very infrequently at an age below forty.

If the diagnosis of ulcer had been definitely established some time before, we must not take it for granted that all the symptoms which later follow are due only to this ulcer. When a more continuous discomfort with a decline of the general health comes on, when the appetite begins to fade and the food distress is not so dominant we already have squandered the most valuable time and a repeated x-ray examination which was delayed too long, will now perhaps show a neoplasm already advanced.

As the roentgenologic observation is by far the most important and most reliable, though not entirely infallible, diagnostic weapon, we should not be stingy with these examinations and should insist on repetition where necessary. Not only coarse changes of contours but even small filling defects are seen, and a competent roentgenologist is at times even able to notice some localized rigidity of the otherwise perhaps rather normal appearing stomach walls. This he recognizes by observing the progress of peristaltic waves. The x-ray, therefore, may let us recognize a carcinoma before any marked tumor has formed. It lets us recognize gastric malignancy much earlier than all other tests which are for more advanced conditions and therefore do not interest the surgeon very much. I even have almost a grudge against them as they have caused at times inexcusable delay and covered up the diagnosis with a brilliant sheen of scientific thoroughness. Gastric analysis tells us painfully little in the conditions where we really need help, that is in the early cases. The tannic acid test of Rosenkrantz may however well be mentioned. He claims that two to three grains of the said astringent causes the gastric pain to disappear completely for a short period in the cases of ulcer while there is no effect if the pain is caused by carcinoma. Today it is the x-ray examination which is of paramount importance for the establishment of the diagnosis.

Now comes a different problem which x-ray examination often cannot decide; this is the decision as to operability in a given case. The age is not of first consideration. However, the general condition must be thoroughly appraised. We shall not fail to palpate first of all the supraclavicular areas for enlarged glands and then the Douglas pouch through the rectum for possible pelvic peritoneal metastases. These two things, as simple and rudimentary as they appear, may well be mentioned because I have seen uncomfortable situations caused by their neglect.

But let us say the operation has been decided upon. The patient must now be brought into the best possible condition within a short time. His blood is the first consideration. If the hemoglobin is below 75 per cent,

especially if below 65 per cent, a transfusion will be necessary. But in addition he has to be supported by a sufficient amount of fluid and chloride of sodium, particularly in the cases where much vomiting has caused a loss of chlorides. If the nutrition had suffered, the liver is depleted of glycogen, and glucose in considerable quantities must be given. Bleeding and coagulation time may require the administration of calcium salts, though here too a transfusion will do best. I do not see it mentioned as a rule that intravenous sodium citrate is a powerful means to improve coagulation. In some cases a transfusion of citrated blood has therefore a particularly good influence. However, to get this double benefit such transfusion should not be given more than twelve hours before operation, because this artificially increased coagulability due to the sodium citrate soon disappears.

If the patient is suffering from a pyloric growth with considerable retention of his food and perhaps even a marked dilatation of the stomach, repeated gastric lavage is in order. If there is no tendency to bleeding the addition of twenty or thirty drops of hydrochloric acid to a quart of water used for the lavage adds a disinfecting quality. If we then give only strained gruels and principally Bulgarian sour milk the gastric flora will be favorably influenced. In addition to this, as mentioned, intravenous saline with 5 or 10 per cent glucose will be given. If there is a tendency to bleeding during this preparatory time a styptic fluid, called sistosan, prepared by Dr. Pancaro of Sudbury, Ontario, may give gratifying results. I intend to speak of this preparation in connection with the post-operative management.

We now come to a short discussion of the operation itself. The anesthetic of choice for us for the last six years has been spinal anesthesia. With spinocain, or half spino- half pantocain, from 2 to 2.5 c.c. and turning the patient clear over on his stomach, with the fourth or fifth dorsal spine as the highest point, as I described it in the December number 1930 of MINNESOTA MEDICINE, we have had very satisfactory results. When spinocain is used, the turning over and elevating the body greatly helps to bring the anesthetic to the area wanted. There is no uncertainty as to this effect. We have observed the selective localization in many hundreds of cases. If the operation lasts somewhat too long for the duration of the anesthetic, we have several times done with satisfaction what Maxeiner recommended, i.e., injected the abdominal walls with novocain before starting their closure. If during the work on the stomach, some pain should occur, local novocain infiltration of the gastro-hepatic ligament is advisable.

The incision is made to the right or left of the mid-line, with the anticipated difficulties in mind. Balfour's left sided incision is of advantage in case we have to go far up on the lesser curvature. In operating near the cardia, cutting of the costal cartilage, preferably from the abdominal side, improves the accessibility to a considerable degree.

The first thing then is a survey of the condition, the extent of the growth, its possible fixation and the extent of lymphatic involvement. The latter is the

most important for the ultimate prognosis. The x-ray has given us as a rule reasonably good information concerning the extent, though it will often be found to be greater than demonstrated on the film. As to the fixation of the growth, we should not be too timid, particularly in the absence of widespread lymphatic invasion. I received recently word of the death on December 5, 1935, of a patient over eighty years old, on whom I had made in September, 1915, a resection of the stomach for carcinoma which necessitated the removal of a piece of liver and some pancreas. The carcinoma was located at the lesser curvature and the posterior wall. The absence of lymph node involvement had made me risk an extensive resection. According to a letter from his daughter he had "no trouble with his stomach. Death was due to arteriosclerosis."

If the tumor is at the pylorus and does not reach far to the left, a Billroth I gives an ideal result. I shall show you the sketch of a case where by nicking the duodenal end somewhat, the difference between the openings of duodenum and stomach was moderate and the two ends could be united by a circular suture, taking somewhat larger bites on the stomach side, which naturally became slightly puckered. The ulcerated carcinoma had penetrated toward the pancreas. With long shallow cuts the fibrotic bottom of the ulcer was removed together with the pyloric mass, going as deep as the fibrotic change would allow us, and avoiding opening the ulcer cavity, which would have meant soiling the wound. The resected area measured seven centimeters at the lesser curvature, but the shape of the stomach was such that the lumen was not too wide for a circular suture. Only the rim of the mass showed carcinoma, while the bottom was a plain ulcer. Ulceration had here apparently overtaken the neoplastic alteration or carcinoma had started secondarily at the edge of the ulcer. The operation was over ten years ago and the patient now feels entirely well.

When the gastric opening after resection is too large for this circular suture, it has to be reduced by closing it from the lesser curvature down. This causes a somewhat dangerous point, called angulus mortis, where it meets the circular gastro-duodenal suture. It requires especially good suturing and is best protected by an omental tag. In general the Billroth I operation, however, has the drawback that it may induce the surgeon not to make his resection sufficiently extensive and deliberate.

As experience makes one favor wide and extensive resection, therefore a Polya operation is the most handy for the average case. The upper half of the stomach wound is closed with a continuous suture, using only the lower half for the stoma; but the gut is sewed all the way up on the gastric wound and even a little beyond it on the lesser curvature. This adds security to the closure of the dangerous upper angle of the suture. It is of advantage to sew the gut to the posterior wall of the stomach before removing the portion containing the growth. In the cases where the remnant of the stomach retracts far up I have never hesitated to make an anterior Polya and have not had

reason to regret it. The operation is easier. If the typical Polya is made it is, of course, important to suture the rent in the mesocolon to the stomach far enough away from the emerging loop to avoid compression or kinking.

As to the suture, catgut as offered in the market for intestinal work with the needle fixed to the end of the thread is very convenient, but especially in dilapidated patients at least a few additional interrupted linens or silk sutures increase the feeling of security. It is well to remember that an intestinal suture, even silk suture, weakens the first days by a gradual cutting through of the threads and is weakest on the fifth day, from which date on the resistance to tension increases again in strength by the increase in the firmness of the union of the tissues. On the seventh day the union has reached the initial strength of the first day, and from then on rapidly becomes more resistant.

Sleeve resection of the stomach may at times be chosen when the growth is well confined to the midportion and the glands seem uninvolved. In two cases I had to add a resection of the transverse colon because the growth had invaded the mesocolon so much that large vessels were involved.

A somewhat difficult point is at times the closure of the duodenum. Linen or silk is best used here. There is no objection if it becomes necessary to strip off a few millimeters of pancreas, keeping in mind that only serosa-covered intestine agglutinates readily. Draining directly from the duodenal stump invites leakage. Draining should, therefore, be placed, when desired, to the side of the sutured area, preferably one inch away from it. I have practically never used such draining. An omental graft, if necessary a free graft, helps to protect against leakage.

You see in practically all textbooks when anterior gastro-enterostomy as in a Billroth II is described that an entero-anastomosis is advised. However, if you suture the jejunum for a distance to the stomach above the gastro-enterostomy opening and constrict the inlet somewhat by taking here wider bites as I described in the April, 1919, number of "Surgery, Gynecology and Obstetrics, you will not need the entero-anastomosis. The sutures are so placed that they pull the gut upward on the upper portion of the gastro-enterostomy opening which straightens the outlet. The alkaline duodenal juice reaches thus the gastro-enterostomy and therefore protects better against jejunal ulcer.

There will always remain the personal element of the surgeon himself. Each man has to know how far his individual ability will reach. He will also take into consideration the age of the patient. In a young person he will make the resection far outside the recognizable limits of the growth, while in an old one with a reduced life expectancy he will weigh the operative risks more exactly. There may present itself even an indication for a two-step operation when a pyloric stenosis of long standing has reduced the general condition to an undue degree. At the first stage a gastro-enterostomy is then made which will allow a marked improvement of the general resistance, and three to five weeks later the resection can be done. A reason-

able amount of x-ray treatment starting two weeks after the operation will perhaps counteract the drawback of the delay.

Gastro-enterostomy alone in carcinoma of the stomach is mostly a miserable operation which surgeons try to avoid, though an exceptional situation may force this procedure. It should then be preferably anterior and the mentioned hooking up of the inlet will avoid an enteroanastomosis. Against *anterior* gastro-enterostomy especially in ulcer cases there seems to be in many quarters a great aversion which is not very well justified. In fact it has a feature of advantage which I have never seen pointed out. While the suture of the posterior gastro-enterostomy lies at the bottom of the lake of acid gastric content, the anterior is suspended in the dome of the gastric air cushion. You know from your x-ray observations that the stomach always contains a respectable quantity of air. If one remembers the really great bulk of alkaline secretion coming from the duodenal side, one can imagine seeing it enter through the anterior-gastro-enterostomy opening in the dome of the air cushion in the recumbent patient. The insignificant amount of acid secretion from the neighboring gastric mucosa could in no way stand up against this almost constantly flowing alkaline well.

We come to the after-care. When I used nothing but silk in my earlier work, I had no more trouble with jejunal ulcer than later with catgut prepared for intestinal work; in fact it seems to me, I had less. One did have little fear of the reliability of the suture, while with a rapid absorption of the catgut the wound is too little resistant even if we wait a few days before starting to feed the patient. The catgut reaching through the mucosa is absorbed and a strong wave of even liquid food might cause the mucosa suture-line to part, which would be the entering wedge for the formation of an ulcer. However, in resection for carcinoma, this danger is insignificant.

Bleeding after the operation is more important and here Pancaro's sistosan seems to be of help. Pancaro himself had some apparently striking results in gastric bleeding. The preparation is made from vegetable material. The formula is not yet made public and the product is not yet on the market as Dr. Pancaro is waiting for more extensive clinical tests. But I am of the impression that we have here an agent which is of great value in capillary bleeding as well as in severer bleeding from larger vessels. A few weeks ago a patient of mine vomited some blood the day after a gastro-enterostomy. He then received three tablespoonfuls of sistosan. There was no more vomiting and the further course was quite smooth. What part the sistosan played is, of course, not sure. However, though I am still in the stage of testing the preparation, I feel that Dr. Pancaro has found something of great value. There does not occur any untoward progressive thrombosis in the vessels.

The insertion of a nasal suction tube after operation guards us from a blowing out of the suture line in case of undue accumulation of gas or liquids. Twice I remember having inserted the nasal tube before operation and having directed the lower end through

the gastro-jejunal opening for eight or ten inches down into the jejunum. In these cases we felt the need of prompt postoperative feeding, and in this manner avoided making a jejunostomy, which otherwise is very divisible in extensive resection, as feeding can be started promptly.

In anemic persons the administration of hydrochloric acid a couple of weeks after the operation, at first in small doses, often does much good for the general come-back of the patient. A colleague reported to me that in one of his cases calcium phosphate was given by his associate and severe intractable diarrhea persisted. Acid calcium phosphate is absorbed by the intestines. However, in the case mentioned the neutral calcium salt in the absence of hydrochloric acid formed soap with the fats (fatty acids) and the patient thus had the effect of soap suds administration. Giving hydrochloric acid promptly stopped the diarrhea.

Let me emphasize that the diagnosis of carcinoma of the stomach is by no means a death warrant, and when you read (Am. Jour. Surg., Feb., 1936, p. 137) that: "Nearly all cases of gastric cancer result in death within a short time after diagnosis" you know that it may appear that way to the statistician, but that it is reality this picture is drawn far too black. In my comparatively small material are three patients who were well for over twenty years after resection. None of these, too, was an early case. They had, however, very little or no noticeable involvement of the lymph nodes though the tumor masses were in each case the size of a woman's fist.

The absence of an invasion, or let us say, the absence of a marked invasion of the lymphatics, therefore, is of foremost importance for a hopeful outlook. A most noteworthy observation on the necropsy material of an institution was detected by the late J. B. Murphy and emphasized properly by C. H. Mayo as of great value. It is well worth restating. In that institution over one hundred and fifty cases of cancer of the stomach had come to autopsy without operation. Twenty-five per cent of these cases had no wide-spread involvement of the lymphatics and, therefore, had died of a purely local disease, be this through cachexia, obstruction, bleeding, or perforation. You can at once see here the great chance for surgery. In recent years the carcinomas of the stomach are often divided into two main groups, which has much clinical justification. The one group is called the *fungating* type, the other the *infiltrating*. The first group contains the cases of bulky tumor masses with mostly a sharp macroscopic delimitation. The word "fungating" does not appear to me especially well chosen, inasmuch as it insinuates a spongy soft growth. However, the more spongy and soft the growths are the readier will they ulcerate and break down. A very soft, malignant growth is liable to be digested away almost completely, and then leaves an ulcer, little indicating its real nature. The characteristic bulky tumors are adenocarcinomas of mostly a low grade malignancy. They are well outlined. But we should not trust the outlying districts too much, as could well be seen in a case of mine. This patient free from recurrence died of apoplexy twenty-four years after resection of the stomach for

one of these bulky adenocarcinomatous tumors (Annals of Surgery, October, 1930). The resected specimen showed the tumor mass protruding greatly into the lumen of the stomach and was apparently well outlined. The resection had been made at a good distance from the growth. The tumor was situated at the lesser curvature near the pylorus, and, as you will see from the photograph of the specimen, the resection at the lesser curvature was made a good five centimeters distant from the edge of the growth. It seemed almost unnecessarily far away; only a small piece of stomach remained. Macroscopically the mucosa was normal to the very edge of the growth though the gastric wall was here a trifle thickened. Microscopically the carcinoma extended for two full centimeters in the mucosa, the secreting glands being of giant size and irregular shape. There were no metastases in the lymph nodes.

At the beginning of this short paper the early recognition of the growth was emphasized as the main factor for a hopeful outlook. This should always be put in first place even if it were only for its propagandist value. The patient must reach his surgeon as early as possible. But of equal or perhaps even more importance for a favorable outlook is the character of the neoplasm. Even an extensive bulky so-called fungating growth offers a considerably better chance for permanent recovery than a very much smaller one of the infiltrating kind.

Discussion

DR. O. W. WANGENSTEEN: It was a pleasure to have heard this interesting presentation by Dr. Arnold Schwyzer. We, of this medical community, are indebted to him on a number of scores and I for one count it a privilege to have come within the radius of his scholarly stimulation. May the impress which the brothers Schwyzer have left with us be long remembered!

To hear one speak from his own experience is to know that knowledge tempered with wisdom is being imparted to us. One who has occasion to consult medical texts for reference often has cause to hope that those who write would confine themselves to their own personal knowledge and experience. When this guide becomes more uniformly observed, many of the ancient errors copied from generation to generation will be corrected in our texts and from their pages many medical and surgical barnacles will be deleted.

The mortality of cancer of the stomach treated medically is 100 per cent. The results from surgery have not been too reassuring; yet, one can not help but feel somewhat depressed over the limitations of our art. Except for the cancers of the skin, what malignancies are there which should afford us real cause for elation over the results of treatment? When Billroth in 1890 discussed the surgical treatment of cancer of the stomach before the German surgical congress, he said that with improved surgical technic and better diagnostic methods, the results of treatment would be better. Roentgen diagnosis of stomach disorders has come and numerous improvements have occurred in the surgical technic, but there remains much to be desired in the treatment of cancer of the stomach. The operation is a formidable one and commands a respectable mortality and of the cases that survive operation, unfortunately the number which live and are free from disease for more than five years is not considerable. Yet, surgery is the only agency which holds out any promise for cancer of the stomach. The

results with x-ray or radium treatment have, in the main, been very disappointing. The most serious aspect of the problem, however, would appear to be that so large a number of cases are beyond any remedy when they come to the surgeon for relief. It is gratifying to know that Dr. Schwyzer had three cases of cancer of the stomach which long periods of observation proved to have been cured.

Dr. Schwyzer has properly stressed the x-ray as the most valuable agency in the early detection of cancer of the stomach. Yet, recent personal experiences in which cancers of the stomach have failed of detection in the hands of competent roentgenologists have suggested that even this method has its shortcomings. Recently Dr. George Fahr of the Minneapolis General Hospital asked me to operate upon a case of cancer of the cardia of the stomach which he and Dr. Arthur Kerkhof diagnosed by gastroscopy. Dr. Arthur Zierold, chief of the surgical staff of the Minneapolis General Hospital, knowing of my interest in lesions of the upper stomach, kindly permitted transfer of the patient to the University Hospital. Roentgen study of the stomach at the Minneapolis General Hospital as well as at the University Hospital failed to disclose a lesion. At operation an indurated area somewhat more than three inches in length and about two inches in width was found at the greater curvature—the center of the lesion being slightly above the points of juncture of the middle and upper third of the stomach. A subtotal excision was easily done and the patient made a very satisfactory recovery. The excised specimen revealed a small ulcer at about the middle of the indurated area; histologic examination of the specimen selected from many places in the indurated area all showed scirrhous carcinoma. Since then, Drs. Fahr and Kerkhof asked me to operate upon a second patient, who had been studied roentgenographically periodically over a period of three years without the finding of a lesion. At the University Hospital, just prior to operation, a definite filling defect was found high on the lesser curvature. Operation disclosed a lesion on the posterior wall; metastases were present and the lesion was already definitely inoperable.

That a number of cases with cancer of the stomach come with long histories is well known and I believe that there is as assuredly *acute and chronic cancer* as there is acute and chronic infection. I grant that perhaps the instances referred to above are somewhat unusual and that small lesions in the cardia, at the greater curvature, or on the posterior wall of the stomach are probably among the most difficult for the roentgenologist to detect. We all know how much superior cystoscopy is to the cystogram in the recognition of lesions of the bladder. To be certain, the analogy between direct visual examination and roentgenography of the bladder and stomach is not perhaps a particularly good one; yet, I am inclined to believe that gastroscopy may prove to be an agency of real merit in the earlier detection of cancer of the stomach. We all lament the late recognition of cancer of the stomach; it would be interesting to know in a series of inoperable cases of gastric carcinoma, how many of the group had received a roentgen diagnosis of "negative stomach" in competent hands in the preceding year. Earlier means of recognizing the presence of malignancy are still to be desired.

In the operative treatment my own inclination is to operate under general anesthesia, employing ethylene and ether. A duodenal tube is inserted prior to operation and small quantities of tenth normal hydrochloric acid are instilled at frequent intervals for a few hours preceding operation. The virtue of hydrochloric acid in keeping the empty normal stomach free from bacteria is well known. The operative procedure itself should be carried out with the most strict aseptic precautions—particular care being taken to obviate any contamination in the making of the anastomosis. The writer has found employment of 1 per cent sodium

ricinoleate satisfactory for this purpose. Constant suction is applied to the indwelling catheter for several days after operation—3,000 to 4,000 c.c. of 5 per cent glucose being given daily intravenously meanwhile.

I have just recently reviewed the University Hospital experience with cancer of the stomach. During the last thirty months thirteen gastric resections were done for malignancy by me; during this period there was one hospital death. Another of the group has since died of recurrence. Our criteria in operating for cancer of the stomach are essentially as detailed by Dr. Schwyzer: (1) that the general physical status of the patient warrants operation; (2) no distant metastases are present; (3) ascites is not demonstrable; (4) the lesion is resectable from an x-ray standpoint. The film made in the erect posture occasionally reveals normal gastric wall above the lesion when the film in the horizontal position would indicate that the lesion extends to the esophagus. Transfusion is an aid of great value in improving anemic patients for operation.

Dr. Schwyzer said that he had not considered carcinoma of the upper end of the stomach as an operable lesion. There have been occasions when I wished that I had been as prudent. I was unfortunate enough to have the first patient upon whom I did a total gastrectomy get well. Then I operated upon several additional ones, all of whom died. This experience has discouraged me considerably but I am still hopeful that some day an adequate operative procedure will be improvised to deal with these high lesions. Retraction of the esophagus after the esophago-jejunal anastomosis and infection are the obstacles to success.

DR. R. C. WEBB: This discussion of carcinoma of the stomach by Dr. Schwyzer has been most interesting and encouraging. I would like to add a further note of encouragement in the operative treatment of carcinoma of the stomach and to place on record the following case report of a carcinoma of the body of the uterus followed by carcinoma of the stomach. The patient, sixty-four years old, was the wife of a physician who first came to us in August, 1929, complaining of a watery, vaginal discharge. Symptoms began in 1927 with a blood tinged, watery discharge. Dr. Wynne curetted the patient, and the diagnosis by Dr. Floyd Grave was carcinoma of the body of the uterus. She was also suffering with a chronic diabetes. Radium treatments were given in the uterus with the assistance of Dr. C. R. Drake. The diabetes was treated by Dr. T. A. Peppard. In November, 1929, I assisted Dr. Wynne, and a panhysterectomy was performed at the Asbury Hospital. Carcinoma was still present in the body of the uterus.

The patient developed stomach symptoms, five years later, early in 1935 at the age of sixty-nine. She consulted Dr. T. A. Peppard, who made a complete study of the patient and referred her to Dr. R. G. Allison for gastro-intestinal examination. A diagnosis was made of carcinoma involving the pyloric end of the stomach and extending back on the greater curvature about four or five inches. The opinion was expressed that this lesion was probably resectable. In April, 1935, I explored the patient at the Northwestern Hospital and found a mass which began exactly at the pylorus and extended upward about one and one-half inches on the lesser curvature and about five inches on the greater curvature. I resected the distal three-fifths of the stomach, and performed an anterior Polya type gastroenterostomy and entero-anastomosis operation. She also had a cholelithiasis which was not treated. The pathological report by Dr. Margaret Smith was: carcinoma of the stomach. The patient is alive and apparently well at the age of seventy and over six years after removal of a carcinoma of the body of the uterus and one year after removal of a carcinoma of the stomach.

DR. F. R. SEDGELEY (by invitation): After Dr. Wangenstein's very thorough discussion of Dr. Schwyzer's paper there is little urge to attempt to add to it.

A reference he made to lesions on the posterior surface, or greater curvature, however, prompts me to speak of our experience at the Veterans' Hospital during the past few years. This has led us to assume that any such lesions are malignant until proven otherwise.

The reason for this viewpoint has been emphasized very recently by a striking case. The patient came in with all of the symptoms of acute perforation of a peptic ulcer. The ulcer was on the greater curvature of the pars media. There was nothing about the lesion to arouse the slightest suspicion of malignancy. The ulcer was resected and routinely sent to the laboratory. This patient made an unusually satisfactory and rapid recovery and left the hospital promptly. The following day a laboratory report was received which reported malignancy. If ever there was an early case, apparently this was one. With the expectation of an unusually early and favorable case, the patient was sent for, the situation explained to him, and he was reoperated, but already numerous lymph nodes were involved, and, although a radical resection was done, the downward progress was extremely rapid, and in spite of another excellent immediate postoperative recovery, his death occurred in a few months.

The point has been brought out that the nature of the lesion determines the prognosis in these cases. One cannot be sure of the lesions in the early case, even when they are in the hand. Why some of these patients live after operation when the condition is so extensive at the primary operation, even living for many years after having been classified inoperable with metastases at time of operation, and others pursue a rapidly fatal course when the size of the lesion and signs of malignancy are minimal, must be explained by the as yet unknown factors involving the essential nature of malignant disease.

DR. A. A. ZIEROLD: I was too late to hear Dr. Schwyzer's paper and consequently can offer no pertinent comment. One question occurs to me: what most determines the end-result in carcinoma of the stomach, the nature of the growth or the nature of the surgical removal? My own experience would lead to the belief that little change in statistics of survival may be expected until more is learned of the early symptoms and appearance of carcinoma of the stomach.

I believe that we owe much to Dr. Schwyzer, not only for the high surgical standard which he has maintained in this vicinity, but for his generous contributions from his own experience.

DR. H. A. H. BOUMAN: I have known Dr. Arnold Schwyzer more than forty years. He was prominent then. By simply "working each case and penetrating it with growing capacity" he has been a master many times. However, it is not the master so much as the personality, that we are so fond and proud of. In moral strength, ethical professionally, always helpful, he represents the hippocratic physician.

Alterius non est, qui suus esse potest.

DR. O. A. WANGENSTEEN: The complaints of these two patients in which gastroscopy proved of more value than the x-ray in the diagnosis were essentially those of gastro-intestinal dysfunction, viz., abdominal pain and distress. Both patients were middle-aged; the first, a woman, had a shorter story, only of several months standing and had had occasional vomiting of blood. There had also been great weight loss. The second, a man, had suffered from abdominal distress for three years.

Having the privilege of the floor again, I should like to ask Dr. Schwyzer concerning his manner of

closure of the abdominal wall after gastric resection. We see evisceration more frequently after gastric resection for cancer than after any other abdominal operation. We have been meticulously careful in all matters relating to asepsis in wound care and have felt some pride in the rarity with which wound infection is observed. Recently, a patient eviscerated on the fifth day after operation and not a vestige of catgut was found in the wound; there was no evidence of infection. Fortunately, following mere strapping of the wound with adhesive tape (a long Penrose drain being placed between the edges of the skin) this unfortunate accident is usually well tolerated. The employment of suction obviates the occurrence of obstructive phenomena and this practice in dealing with evisceration we have found safer than resuture of the wound. Dr. Schwyzer made no mention of evisceration and I should like to hear whether this complication has given him any trouble. A number of surgeons doing gastric surgery who have interested themselves also in wound healing have informed me that they too have been troubled with the occurrence of evisceration after gastric resection for cancer.

DR. CABOT: I am interested in what Dr. Wangenstein has said about evisceration. We have had this experience twice, though they occurred later, about the tenth or eleventh day.

Dr. Schwyzer was speaking about the anterior Polya, with the partial closure of the gastric stomach. I was wondering whether he noticed any undue angling of the upper arm, and if the Doctor ever felt the necessity of doing an entero-anastomosis.

DR. ARNOLD SCHWYZER (closing): I thank you for your very kind discussion.

Talking about evisceration, as far as I remember we have not had any (except in a case of tuberculous peritonitis). In former years I always used linen or silk for the fascia, or straight through-and-through double silkworm stitches, tied on both sides over rubbers or buttons and never removed them for at least thirteen days; often left them in until the sixteenth day. If, in a fleshy person, a wound is infected or if it is expected to become infected, a silkworm suture going in on the side and grasping the fascia by a double loop and going out onto the skin *on the same side* as entered is of advantage. You can then leave all the fatty subcutaneous tissue open if you want to and still have a firm closure.

Of perforations in carcinoma of the greater curvature or near it I have seen two cases. In one there was an acute perforation into the peritoneum. She died a year later of metastases in the liver. Another one perforated at operation while excising the growth from the abdominal walls, into which it had grown. Plugging the opening with one finger we resected the stomach. Three years later he had an accident and I am told a gastric fistula followed. He then died within a few months.

Dr. Wangenstein is quite right about the tumors on the greater curvature that may not show on the x-ray. X-ray is the best, but not infallible. With the lateral x-rays we often see a lesion on the posterior wall. You asked me a month ago to talk on carcinoma of the stomach and I had no time to look up all my cases, so could not say what the operative mortality was.

I remember at this moment a death which revealed an interesting condition. A carcinoma of the stomach had gone far in the mesocolon. A large artery was in intimate neighborhood to the growth. We resected the stomach and colon and made an end-to-end anastomosis for the latter. The man did well for seven days. At the end of the week he suddenly got weak and died. At autopsy the stomach part was perfectly all right. The colon on the right side was normal up to the very

suture line. The left side was gangrenous. It occurs in a rare case that the right colic artery furnishes the circulation for the whole left colon.

Let me use the time which is left to say a little more about the styptic fluid sistosan.

Dr. Pancaro, whom I know as an excellent and reliable student, a graduate of the University of Rome, and a former interne of St. Joseph's Hospital of Saint Paul, reported to me that in a demonstration at Ottawa, he cut the jugular vein and carotid artery of a dog and after compression with a sponge soaked with sistosan supplemented by additional similarly soaked sponges over it, had after ten minutes a complete hemostasis. The skin was sutured together after removing the sponges without further securing the vessels and the dog lived. At that time he confined himself to injuring half the lumen, but in a later experiment he severed the artery completely and stopped the tremendous bleeding in eight minutes. Upon my request this experiment was kindly repeated by Dr. Warner F. Bowers in the laboratory for experimental surgery of the University of Minnesota. The dog is living.

We have used the preparation in a little over forty cases of different kinds such as prostatectomies, amputations, et cetera. We made an amputation above the knee for senile gangrene. We didn't need a single ligature. Only for safety's sake I put a fine catgut around the large popliteal vessels (which were thrombosed). There was no bleeding. Then sistosan was used in persistent bleeding after tooth extraction. Dr. Livingstone, of Hudson, Wisconsin, had a man who came to him with persistent bleeding after such a tooth extraction. Dr. Livingstone had some sistosan and applied it. The bleeding stopped permanently. We further used it in uncomfortable oozing in abdominal or goiter work, etc. However, it is with me still in the experimental stage. Where we cannot apply pressure at the same time we should not expect too much. In one case of varix aneurysmaticus of the wrist where even sewing with a fine needle and thread gave very uncomfortable bleeding, sistosan was put on for about 40 seconds and the bleeding stopped. All my wounds where sistosan was used healed per primam.

Dr. Pancaro made numerous experiments to ascertain the manner of action of the sistosan and found

among other things (to mention only some which impressed me most) that:

1. It does not damage tissues in any way, as I could observe myself.

2. Given by mouth or in repeated small doses intravenously, it does not always reduce coagulation time, but reduces the bleeding time down to half.

3. Its effect is due to a stimulation of the excito-secretory action of the leukocytes which causes the giving off of profibrin ferment, this action being different from any other known styptic.

4. Small veins, due to the collapse of their lumen are not quite as readily influenced by the sistosan as arteries.

5. In cases of hemorrhage from gastric or duodenal ulcer he reports arrest of the bleeding (as well as could be judged from the clinical course.)

6. He also reports results in hemoptysis, metrorrhagia, epistaxis, and in eighty-six cases after tonsillectomy.

7. What was of special interest to me, he reports a good result in a case of "very severe" postoperative hemorrhage from the epigastric artery due to wound infection and in twelve cases of fifth day hemorrhage. Such bleeding due to a septic melting down of the blocking thrombus is particularly vexatious and often requires a ligation at a more proximal place in the course of the artery.

I think there is something real in that substance. He prepares it from about one dozen different kinds of plants. The history is interesting. His father was a doctor in Italy, and also was a good botanist. When the son left for America, he gave him this preparation along in a powder form saying that sometime he would be glad to have it. A case came with a three days' bleeding after a tooth extraction and everybody having tried everything else, he thought of the powder his father had given him. It stopped the bleeding and he began to think more of the preparation, made an aseptic lotion of it and tested it out.

Following the scientific program a short executive meeting was held. The meeting was adjourned at 10:00 p. m.

E. A. REGNIER, M.D., *Secretary*.

The Doctor's Depression Burden

The American Medical Association has just ended its national convention at Kansas City, while the Minnesota Hospital Association has closed an annual gathering in St. Paul. Discussed repeatedly at the nation-wide assembly of physicians were various proposals for socialized medicine. Minnesota hospital administrators recognized, meanwhile, the problem represented by a growing shortage of registered nurses.

Despite the critical depression problem that has made collection of fees so difficult for doctors, the American Medical Association is not rushing into espousal of any socialized plan. Dean Upham of Ohio State's College of Medicine was chosen President, and his "platform" included strong advocacy of "keeping medical practice individualistic."

Acknowledging growth of plans to finance medical service for persons of low income, Dr. Upham says the national association is looking into all such proposals to determine if there is one that can be used on a bigger scale. "That will take a long time," he declares. "Meanwhile, physicians are taking care of the poor. They will not be neglected."

Government relief funds have, of course, helped vastly in providing needed medical care. But the doctor has borne more heavily than perhaps any other business or professional man the burden of the "border-line case." He has performed his humanitarian work, knowing often that he would never be paid, certain most of the time that he would have to wait for his money. If depression heroes are being sought, America's doctors amply qualify.—Editorial, *Minneapolis Journal*, May 21, 1936.

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of April 8, 1936

THE regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club, on Wednesday evening, April 8, 1936. The meeting was called to order at 8 o'clock by the President, Dr. Thomas S. Roberts.

There were fifty-two members and four guests present.

Minutes of the March meeting were read and approved.

The scientific program followed.

SOME PRACTICAL APPLICATIONS OF ACOUSTICS IN MEDICINE

Illustrated by Sound Pictures and Slides

HORACE NEWHART, M.D.

and

HENRY E. HARTIG, Ph.D.†

(by invitation)

Minneapolis

Abstract of Dr. Newhart's Paper

Dr. Newhart's paper dealt with a consideration of some of the basic facts concerning sound as related to medical practice:

Sound plays an increasingly important rôle in medicine. We have accepted so casually the rapid growth in our knowledge of the properties and possible applications of sound that we are prone to overlook its rôle in relation to the etiology, diagnosis, prevention, treatment and amelioration of disease.

As introductory to the presentation of the excellent sound moving pictures* on (a) Sound Waves and Their Sources and (b) Fundamentals of Acoustics, made possible by the newly organized and very efficient Department of Visual Education of the University of Minnesota and the paper to be read by our guest speaker, Dr. Henry E. Hartig, of the Department of Electrical Engineering, reporting the results of an extensive investigation of commercial hearing aids, a brief consideration of some of the basic facts concerning sound as related to medical practice seems in order at this meeting.

1. A fundamental fact which as physicians we never should forget is the physiological factor of safety, by virtue of which man normally possesses an acuity of hearing materially greater than he needs to meet his ordinary requirements in civilized life. Thus a person can sustain a very considerable loss of hearing without noticeable inconvenience and without even being aware of his defect. Inspection of Table I shows how acute is our normal hearing and also how unsuit-

able is the human voice as a means for testing hearing acuity, especially in the detection of a slight, very often significant, hearing loss.

Table II shows the great variation in the audibility of the various components of articulate speech. It explains why a relatively slight degree of hearing loss, especially for the high tones, interferes with the correct interpretation of speech, the weaker consonant sounds becoming imperceptible while the more dynamic vowel sounds are still heard.

2. A second important principle often overlooked is that a tone or noise of given loudness masks or makes impossible of perception other simultaneously produced sounds which are of a less degree of loudness or intensity. In other words, a listener is made to have for the time a hearing loss equal to the loudness of the masking sound. (The standard unit employed to designate degrees of loudness, acuity of hearing and degrees of hearing loss is the decibel, abbreviated db.) This fact makes it all-important that any tests in order to be sufficiently delicate and accurate to disclose slight degrees of hearing impairment must be conducted in places relatively free from the interference both of external noises and those caused by reverberation from nearby reflecting surfaces.

3. One's hearing acuity is determined by the acuity of hearing of his better ear. Thus it not infrequently happens that a person may entirely overlook or ignore a considerable hearing loss in one ear. For this reason he often fails to seek medical aid when it might be most effective.

4. In testing the hearing of each ear separately by means of the conversational or the loud voice, the better ear, if it is normal or only moderately impaired, cannot be excluded by the customary expedient of plugging its canal with the finger tip. To exclude effectively the ear not being tested, it is necessary to use a noise-producing exclusion apparatus like that of Bárány. Neglect to observe this principle often leads to serious inaccuracy and may even result in death through failure to recognize sufficiently early the presence of a total deafness occurring in labyrinthine involvement.

The above are fundamentals of acoustics which every otologist and medical practitioner should never allow himself to forget.

In regard to sound as a cause of disease, it is well known that loud, sudden or prolonged tones or discordant sounds, or noises, not infrequently produce injury of the middle and inner ear, resulting in degenerative changes with definite loss of hearing acuity. Such cases are common in otologic practice.

The harmful effects of noises are by no means limited to the ear. Studies made decades ago and surveys recently conducted by noise abatement committees have proved that the noises prevailing in cities produce dele-

†Associate Professor of Electrical Engineering, University of Minnesota.

*The sound films shown were prepared by Erpi Consultants, Inc., for the University of Chicago, under the supervision of Prof. Harvey B. Lemon and Prof. Hermann I. Schlesinger of the University of Chicago, Dr. Harvey Fletcher of Bell Telephone Laboratories, and Dr. Donald MacKenzie of Electric Research Products, Inc.

TABLE I. MAXIMUM DISTANCES IN A QUIET PLACE FREE FROM REFLECTIONS FOR INTERPRETING CALLED NUMBERS BY PERSONS HAVING VARIOUS AMOUNTS OF HEARING LOSS†

Hearing Loss Units (db)	Average Whisper	Loud Whisper of pp Voice	mf Voice	ff Voice
0	39.5 ft.	222 ft.	1250 ft.	1 1/4 mi.
5	22.2 ft.	125 ft.	704 ft.	3950 ft.
10	12.5 ft.	70 ft.	395 ft.	2220 ft.
15	7.0 ft.	39.5 ft.	222 ft.	1250 ft.
20	4.0 ft.	22.2 ft.	125 ft.	704 ft.
25	2.2 ft.	12.5 ft.	70 ft.	395 ft.
30	15.0 in.	7.0 ft.	39.5 ft.	222 ft.
35	8.5 in.	4.0 ft.	22.2 ft.	125 ft.
40	4.7 in.	2.2 ft.	12.5 ft.	70 ft.
45	2.7 in.	15.0 in.	7.0 ft.	39.5 ft.
50	1.5 in.	8.5 in.	4.0 ft.	22.2 ft.
55	.8 in.	4.7 in.	2.2 ft.	12.5 ft.
60	.....	2.7 in.	15.0 in.	7.0 ft.
65	.....	1.5 in.	8.5 in.	4.0 ft.
70	.....	.8 in.	4.7 in.	2.2 ft.
75	.....	.....	2.7 in.	15.0 in.
80	.....	.....	1.5 in.	8.5 in.
85	.....	.....	.8 in.	4.7 in.
90	.....	.....	.....	2.7 in.
95	.....	.....	.....	1.5 in.
100	.....	.....	.....	.8 in.
110	.....	May be reached by speaking tube	.....	.....
115	.....	Totally deaf	.....	.....
120	.....	.....	.....	.....

TABLE II. RELATIVE PHONETIC POWERS OF THE FUNDAMENTAL SPEECH SOUNDS AS PRODUCED BY AN AVERAGE SPEAKER†

ó 680	û 310	ch 42	k 13
a 600	i 260	n 36	v 12
o 510	ê 220	j 23	th 11
á 490	r 210	zh 20	b 7
ô 470	l 100	z 16	d 7
u 460	sh 80	s 16	p 6
â 370	ng 73	t 15	f 5
e 350	m 52	g 15	kh 1

terious effects on health. They cause retarded growth in infancy, loss of sleep, fatigue, irritability and various functional nervous and emotional disturbances. They produce lessened efficiency among pupils, teachers and those engaged in professional pursuits and cause lessened output by industrial workers. The noise levels in larger cities caused by surface, elevated and subway traffic, construction operations, unrestricted use of radio, whistles, bells, automobile horns, the voices of street vendors and scores of other unnecessary noises vary according to the density of population and many other conditions. They invade hospital, school and residential districts. The noise levels of different locations are shown in Figure 1, and range from 20 db to 90 or more db. Indoor noise levels are shown by Figure 2.

Many of our most valuable diagnostic procedures are based upon the correct interpretation of sound as in direct, stethoscopic, obstetric and percussion auscultation. Even the qualities of the patient's voice and his speech characteristics as judged by the trained ear of the physician often yield valuable diagnostic data. Such possible information is easily missed when the examination is conducted in a noisy place or if, unfortunately, the examiner has a hearing defect. The result of a serious interview between a patient and a most skillful internist, pediatricist or psychiatrist is often made unsatisfactory by distracting or interrupting noises.

The standards of modern otologic practice especially

†From H. Fletcher, Speech and Hearing. Van Nostrand, 1929.

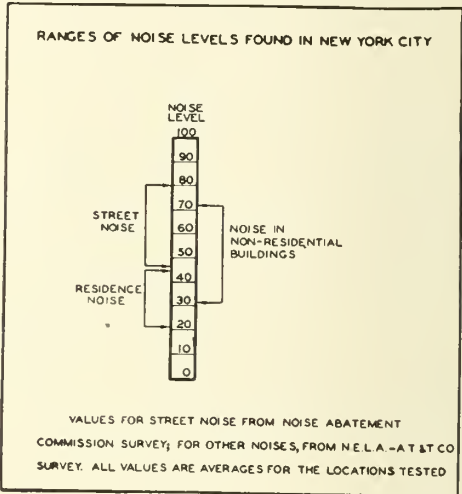


Fig. 1. From City Noise. Report of Noise Abatement Commission, Department of Health, New York City, 1930.

demand that hearing tests for the detection of a hearing loss and the determination of its degree and type be made in places free from interfering noises. For the otologist to attempt to test acuity of hearing in a noisy room is as absurdly inconsistent as it would be for the ophthalmologist to do a refraction in a room in which a cloud of smoke or mist partially obscures the test objects.

Not until recent years has the importance of the early detection of slight hearing loss been properly appreciated. In the young such a discovery indicates the probable presence of a significant hearing loss capable of causing in the school child retardation, speech defects or even an inferiority complex. If overlooked or neglected and the causes are not promptly sought and corrected, a seriously handicapping hearing defect may result sooner or later in life.

In adults, insidiously progressive degeneration of the cochlear apparatus is often first indicated by a loss of

power to perceive the high tones. This condition is revealed only by a careful functional test. The discovery of such a loss demands prompt medical attention to disclose any causes requiring correction.

be not greater than five decibels and the intervals for pitch, if not continuous, in the frequencies from 200 to 4,000 cycles, should be in half octaves. A satisfactory standardized bone conduction receiver as well as a

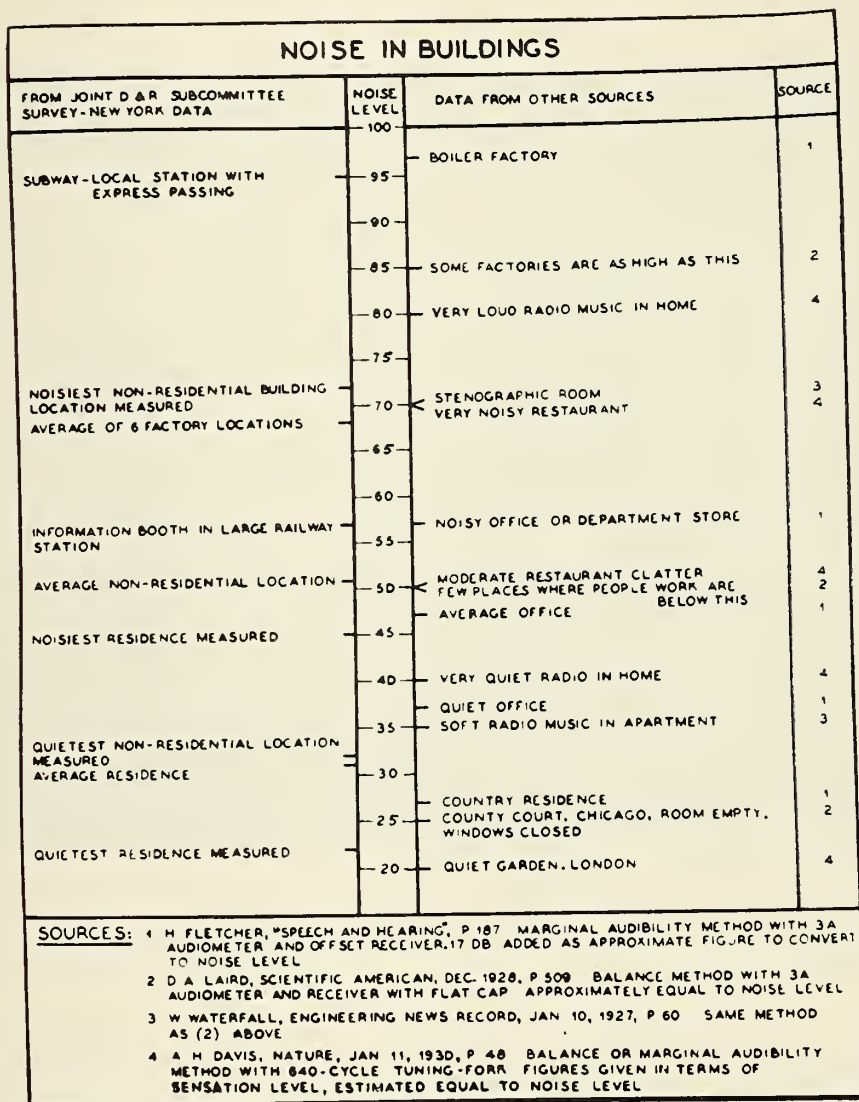


Fig. 2. From City Noise. Report of Noise Abatement Commission, Department of Health, New York City, 1930.

These facts emphatically indicate the wisdom of a regular, periodic, carefully made hearing test as a part of the individual health program at all ages.

It is the consensus of opinion of several hundred leading otologists that the most satisfactory means of accurately testing the hearing is by the use of a reliably constructed audiometer capable of producing pure tones, free from harmonics, covering a frequency range from 64 or 128 to 8,192 double vibrations per second, and having an intensity range from ten decibels below the normal threshold of hearing to near the threshold of feeling. The intervals of graduated intensity should

high-grade air conduction receiver is now recognized as vitally essential for accurate determination of hearing loss and the prescription or selection of an electric hearing aid best suited to the needs of a person having a severe hearing loss.

There has been a growing, insistent demand for reliable audiometers at a reasonable price. Several manufacturers lately have promised to meet this need. Very recently a sub-committee of the Sectional Committee on Acoustical Measurement and Terminology of the American Standards Association, composed of acoustic engineers and otologists, has been appointed

to formulate minimum standards of performance for a satisfactory audiometer. As soon as these standard requirements shall have been made public and duly met by the manufacturers, standardized audiometers which will merit the approval of the Council on Phys-

electric hearing aids. These have been improved in their performance characteristics, reliability, inconspicuousness and appearance. They have a much wider range of application, being now successfully used by hard of hearing school children, both individually and



Fig. 3. Small, serviceable, acoustically treated ear testing room, 4'1"x7'9", with floating ceiling and heavily carpeted floor, in physician's office.



Fig. 4. Two connecting sound proofed ear testing rooms, each 5'6"x12', in University of Minnesota Hospital, Division of Otology. Ceilings and floor floated on sponge rubber. Double doors sealed with sponge rubber and equipped with refrigerator latches.

ical Therapy of the American Medical Association will be available. At such time and only when thus safeguarded, the audiometer should find widespread, satisfactory use among otologists, neurologists, general practitioners, school physicians, insurance examiners and the directors of the medical departments of railroads and other large employers of labor. Such a wide use of the audiometer will make possible larger and more successful efforts in the field of deafness prevention and amelioration.

Already the testing of large groups of school children by means of the phonograph audiometer to disclose those with a significant hearing loss has yielded excellent results in many communities.

Acoustic engineering recently has greatly increased the possibilities of ameliorating the condition of hundreds of thousands of persons afflicted with a handicapping hearing loss by making available more efficient

in class groups for instruction in correct speech and other subjects. Also, because of better performance, many adults who have been unable satisfactorily to use a hearing device now find great help in the newer hearing aids.

The physician, who is often consulted in regard to hearing aids, can be of great assistance to a patient in selecting the type of instrument best adapted to his individual requirements. In assuming this responsibility he should be guided by certain principles.

1. A person whose hearing loss in his better ear does not exceed forty decibels, as a rule, does better without a hearing device.

2. On the other hand, as soon as his loss reaches or exceeds forty decibels, he should be advised to secure promptly the hearing aid best suited to his requirements as determined by a careful otological examination, including an audiogram showing his hearing

loss both by air and bone conduction. If he delays he will too often find it impossible to interpret in terms of speech the unfamiliar sounds he first hears with his instrument.

Recent investigations of commercial hearing aids conducted at the University of Minnesota, a report of which has been accepted for publication in the Archives of Otolaryngology, show that stock hearing aids differ

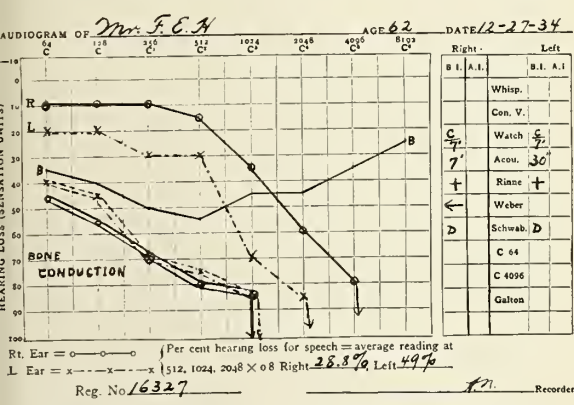


Fig. 5. Audiogram made with Western Electric 2-A audiometer in acoustically treated room. Line B-B is graph for normal bone conduction of right and left ear respectively.

greatly in their performance characteristics. The ultimate proof that an individual has selected the most satisfactory instrument will be found only by making a comparative intelligibility test of several instruments of different manufacturers, uninfluenced by any one interested in the sale of a hearing device.

The problem of noise abatement as a measure for better hearing, increased health and greater efficiency is too large to be solved in a short time. United action by an aroused, enlightened public under the leadership of medical men and physicists is accomplishing much to decrease unnecessary noise in some American cities.

Until the movement for doing away with unnecessary noises shall have achieved widespread results, every physician can successfully meet his individual problem of reducing to a practical minimum the noise level of his immediate surroundings. To do so he need only follow the example of the more progressive shopkeepers, restaurant and hotel managers, theater owners, hospital superintendents and managers of large business offices. These have already shown a keen appreciation of the many advantages of reducing the noise level in their places of business.

Any physician, with the help of an acoustic engineer and a carpenter, at a relatively small cost can eliminate the most objectionable interfering noises from his immediate environment and thus add greatly to his personal efficiency and increase his joy in his work. Thus he will attain greater accuracy in his exacting diagnostic efforts, especially in making hearing tests, and will add materially to the ease and confidence of his patients.

PERFORMANCE CHARACTERISTICS OF ELECTRICAL HEARING AIDS FOR THE DEAF

HENRY E. HARTIG, Ph.D.,
and
HORACE NEWHART, M.D.

Abstract of Dr. Hartig's Paper

The common practice of relying entirely upon measurements of a person's threshold of hearing as a criterion of hearing loss is criticized as inadequate. It is suggested that since an auditor listens to speech, not at the threshold of hearing but at much higher loudness levels, threshold tests are made to bear too heavy a burden when the entire responsibility for measuring hearing loss is placed upon them. The necessity is pointed out for an audiometric study of the equal loudness levels of persons having hearing defects, extending from the threshold of hearing to normal hearing intensities. Sound amplification for hearing loss correction on a frequency selective basis is considered and it is concluded that present knowledge does not warrant acceptance of the theory but rather points toward the necessity for further study. The older uniform amplification ideal is examined, especially with reference to the ability of commercial portable carbon microphone hearing aids to satisfy the ideal. After a preliminary investigation of commercial hearing aids, in which the less effective or worthless devices were eliminated, an extensive series of tests was conducted upon four stock hearing aid models of popular make.

It was found that none of the four closely approached the ideal of uniform amplification. Articulation and sentence intelligibility tests showed that the four models differed very greatly in their speech transmission characteristics, varying from excellent to poor. In amplifying power also, the differences were considerable but not excessive. Methods for investigating the causes of poor transmission characteristics indicate the defect to be associated with wave form distortion which has the effect of introducing extraneous noises in the speech output.

The differences in performance were not found to depend measurably on differences in uniformity of response. In consequence, it is concluded that furnishing frequency response curves to the otologist with each hearing aid would be of no value. Of greater importance is a wide range of response (as a minimum, 200 to 3,000 cycles per second), freedom from singular amplification peaks, and sufficient amplification. Of paramount importance is the actual aid the user obtains in interpreting speech sounds and sentences correctly.

A method is suggested which enables the otologist, by means of a tapered horn, to listen directly to the sound output of a hearing aid. While the method is not free from objection, it should serve to enable the otologist to eliminate from consideration some of the worst of the commercial carbon microphone hearing aids now being offered to the hard of hearing public.

An attempt was made to devise a rational test for

bone conduction oscillators but no wholly satisfactory procedure was found. By transmitting the vibratory oscillator output through a heavy leather belt to an electrical phonograph reproducer, the amplified electrical output of which in turn was converted to sound, intelligibility tests were conducted. These tests confirmed the estimate of relative merit of the four hearing aids as previously determined by the use of the air conduction receivers.

The President expressed the appreciation of the members of the Academy to Professor Hartig and Dr. Newhart for this very interesting program.

The meeting adjourned.

R. T. LA VAKE, M.D., *Secretary*.

Nonspecific Protein Treatment

In *The Journal A. M. A.*, November 30, 1935, p. 1765, appears the first of two special articles on nonspecific protein treatment, prepared under the auspices of the Council on Pharmacy and Chemistry. In this article Dr. Hektoen discusses briefly the nature of the reactions to nonspecific proteins in the treatment of infectious diseases. In *The Journal A. M. A.* for December 7, Dr. Cecil will review experiences and results with this treatment; he shows that modern protein treatment appears to have achieved "a permanent place for itself in modern therapeutics," not only of certain acute and subacute infectious diseases but also in other conditions, notably thrombo-angiitis obliterans. Both articles point out that the effects of nonspecific proteins in infectious conditions are associated with nonspecific as well as specific anti-infectious processes. It is evident that much more study of the changes induced by nonspecific proteins in the human body is required in order to obtain more of an insight into the nature and significance of these processes as they occur under various conditions. From Cecil's review it appears further that the indications, contraindications and limitations of nonspecific protein treatment in its present forms are well under way toward fairly definite establishment. Certainly the indiscriminate and offhand use of the treatment is unwarranted and not free from danger.—(*J. A. M. A.*, November 30, 1935, p. 1776.)

Lactobacillus Acidophilus Milk (Towt) Omitted from N.N.R.

Lactobacillus Acidophilus Milk (Towt), prepared by Towt-Nolan Laboratory, was accepted by the Council on Pharmacy and Chemistry in 1927. At the expiration of the period for which the product was accepted, a number of objections to labels, circulars, and miscellaneous advertising matter were reported. At that time the firm expressed its intention to cooperate at all times but asked that the Council grant a period of six months in which to use up a supply of material that was on hand. The council acceded to this request. When this period had expired, the firm failed to reply to the Council's request that the necessary revised material be submitted; two reminders were likewise ignored. Since the firm failed to submit evidence of its continued acceptability, the Council voted to omit Lactobacillus Acidophilus Milk (Towt) from New and Non-official Remedies. (*J. A. M. A.*, April 4, 1936, p. 1165.)

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

MEDICAL PAPERS DEDICATED TO HENRY ASBURY CHRISTIAN. From his Present and Past Associates and House Officers at the Peter Bent Brigham Hospital, Boston, Mass. 1,000 pages. Illus. Cloth binding. Baltimore, Md.: Waverly Press, 1936.

THE TECHNIQUE OF CONTRACEPTION. Third Edition. By Eric M. Matsner, M.D. Foreword by Robert L. Dickinson, M.D. Introduction by Foster Kennedy, M.D. 40 pages. Illus. Price, paper cover, 50c. Baltimore: Williams & Wilkins Co., 1936.

PASSIVE VASCULAR EXERCISES. Louis G. Hermann, A.B., M.D., Assistant Professor of Surgery, College of Medicine of University of Cincinnati and the Cincinnati General Hospital, etc. 288 pages. Illus. Price, cloth, \$4.00. Philadelphia: J. B. Lippincott Co., 1936.

GLANDULAR PHYSIOLOGY AND THERAPY. A symposium prepared under the auspices of the Council on Pharmacy and Chemistry of the American Medical Association. Chicago: Amer. Med. Ass'n., 1935.

It has been indeed a pleasure to review this book. The individual authors have made these chapters complete as to subject matter, omitting things that would tend to lead one onto borderline subjects.

The subject matter is presented precisely and made clear enough so that anyone with an understanding of the fundamentals of physiology will get a good deal out of reading the book.

The second thing that makes this book worth-while in anyone's library is the fact that the indexing is very complete, making this volume a very handy and complete asset to anyone no matter in what field of medicine he may be practising.

BASAL METABOLISM IN HEALTH AND DISEASE. Eugene F. DuBois, M.D., Medical Director, Russell Sage Institute of Pathology, Professor of Medicine, Cornell University Medical College. 3rd ed. 494 pages. Illus. Price \$5.00. Philadelphia: Lea & Febiger, 1936.

This third edition has brought up to date the significant data on basal metabolism. The author has correlated basal metabolism with clinical medicine and covers the underlying physiologic principles effectively for the practicing physician and student.

The chapters dealing with normal standards and surface area have been rewritten in view of recent contributions and a new chapter dealing with physical channels of heat loss has been added. Many new references concerning the basal metabolism in disease have been added.

The chapter on evaluation of results of basal metabolism tests should be read by all those interested in the clinical interpretation of the estimations obtained.

C. A. MCKINLAY, M.D.

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

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Number 7

SOME HISTORICAL NOTES ON THE TREATMENT OF ANGINA PECTORIS*

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Rochester, Minnesota

THE increasing importance of the anginal syndrome of coronary diseases, and the relative inadequacy of present-day treatment, prompted this quest into the past with the idea of chronologically recording the various drugs and methods that have been used in the treatment of angina pectoris. I have attempted to record the most important and interesting contributions; some have been deliberately omitted, and others undoubtedly deserving mention may have escaped my attention.

In turning back the pages of medical endeavor and progress one does so with a genuine sense of reverence and admiration, like a privileged witness before whom the drama of the history of disease is slowly and arduously unfolded. The innumerable difficulties thwarting the efforts of the early physicians are well known, and their accomplishments become more meritorious owing to their perseverance and determination in gradually overcoming the enormous obstacles of ignorance and superstition. The lack of special methods of examination created many masters of perception who developed to a high degree and wisely used their special senses.

The history of angina pectoris finds its true inception in 1768, when William Heberden recorded his remarkably accurate description of the symptoms of the disorder. In part he stated: "But there is a disorder of the breast marked with strong and peculiar symptoms, considerable for the kind of danger belonging to it, and not extremely rare, which deserves to be mentioned more at length. The seat of it, and the sense of strangling and anxiety with which it is attended, may make it not improperly be called angina pectoris . . . With respect to the treatment of

this complaint I have little or nothing to advance; nor, indeed, is it to be expected we should have made much progress in the cure of a disease which has hitherto hardly had a place or a name in medical books. Quiet, and warmth, and spiritous liquors help to restore patients who are nearly exhausted and so dispel the effects of a fit when it does not soon go off. Opium at bedtime will prevent the attacks at night." Prior to this time occasional references appeared to scarification, cupping, and the use of setons and blood-letting for painful disorders, but the authenticity of such reports referable to the anginal syndrome is doubtful.

Eight years later, in 1776, John Fothergill, another illustrious English physician, commented on the treatment of angina pectoris. He appreciated the relationship of flatulence to the precipitation of the painful seizures and advocated the use of the essence of peppermint to facilitate eructation of gas. In 1790, E. Alexander recommended the more or less continuous administration of small doses of arsenic solution, and he described a case in which he believed the patient was cured by this procedure. W. L. Perkins, two years later, reported what he believed to be a cure brought about by administration of white vitriol (zinc sulphate).

It must be remembered that during this era of therapeutics a great variety of drugs and preparations were in use. Many of these have long since been discarded as ineffectual, but some have survived the test of time. Therapeutic empiricism was a prominent feature of this period of medical development.

At the beginning of the Nineteenth Century, Schlesinger of Germany advocated the use of the extract of *Lactuca virosa* (lettuce juice) as a

*From the Section on Cardiology, The Mayo Clinic.

prompt and efficacious remedy for such spasmodic conditions as asthma and angina pectoris. Lettuce juice was earlier believed to contain atropine, but this was later disproved. It likewise was credited with hypnotic powers. In 1817, Reid, of Ireland, recommended inhalation of oxygen for angina pectoris, but this method of treatment apparently was not widely accepted. Interestingly, Steele, in 1900, eighty-three years later, described beneficial results in the treatment of severe paroxysms of angina pectoris from the inhalation of oxygen. In 1826, Laennec is credited with having favored blood-letting in the treatment of angina pectoris even though his contemporaries were emphatically opposed to the procedure, and insisted that it aggravated symptoms. Three years later Mantell advocated repeated blood-letting and the insertion of a seton. This latter procedure was a frank relic of the days of superstition. Newton, in 1832, used hydrosulphureted ammonia and believed it to be of value in diminishing the frequency and severity of the attacks. The last mention of venesection in the treatment of angina pectoris was found in Batten's article in 1834; in addition to this procedure he recommended administration of belladonna.

Sulphur was employed as an antispasmodic by Munk in 1840. As free sulphur apparently has no action at all in the body, whatever effect could be anticipated would depend on its partial conversion into sulphides. A year later, Schlesier advocated the use of dilute hydrocyanic acid (blausäure) in the treatment of angina pectoris because of its presumed vasodilating effect. In the same year Szerlecki relieved more severe anginal seizures by the subcutaneous injection of morphine acetate. Latham in 1846 used laudanum; it is interesting to observe in this connection that opium and its derivatives were intermittently employed in the treatment of the anginal syndrome since Heberden's original identification of it in 1768. Stokes, in 1854, recommended and used several drugs with apparent benefit. Small draughts of chloroform were believed to be quite effective in relieving attacks, while the use of spiritous liquors, ammonia, and Hoffman's anodyne (spiritus ætheris compositus) was also employed.

In 1857, Gripouilleau enthusiastically employed counterirritation of the anterior portion of the chest, with apparent benefit. These observations,

however, raise the question of the authenticity of diagnosis, and suggest the possibility that certain patients who obtained relief by such a procedure in reality had rheumatic conditions of the wall of the chest. Piorry, in 1864, advocated the administration of quinine sulphate.

It was not until 1867 that the first real therapeutic triumph in the treatment of angina pectoris occurred. Brunton described the almost instantaneous relief which occurred in most cases on inhalation of amyl nitrite. This work paved the way for other investigations dealing with the nitrites, and other contributions appeared in the ensuing sixteen years. This method of treating angina pectoris is included in present-day therapeutics.

Trousseau, in 1867 used atropine and the alcoholic infusion of mint. In 1869, Rockwell and Beard employed galvanic currents over the thorax and presumed beneficial results to be obtained in certain cases. Papillaud, in 1873, advised the rather sustained administration of potassium bromide, believing that the sedative effect of this drug reduced the frequency of attacks. Balfour in 1876 was an ardent exponent of the administration of iodides, and he emphasized the effects of these drugs on arteriosclerosis. In 1879, Murrell brought forth the valuable drug, nitroglycerin, and demonstrated its prompt action in relieving anginal seizures.

Dieulafoy, in 1880, advocated use of the ice bag to the precordial region, suggesting that continuous cooling of this region lessened the patient's appreciation of the attacks. Matthew Hay in 1883 advised the regular administration of sodium nitrite; time has shown, however, that this form of treatment has not been particularly efficacious.

Jakubovski and Mangub, in 1883 and 1885, respectively, advocated the use of *Viburnum opulus* (cramp bark) in the treatment of angina pectoris. It was believed to relieve cramps and on this premise its use was apparently based. Von Noorden, and also Laschkevitch, in 1886 suggested the administration of cocaine, but this form of treatment did not gain much support and apparently was soon abandoned. Huchard, in 1887, urged the use of iodine as the most reliable therapeutic agent in the treatment of angina pectoris. In 1889 Broadbent advised the administration of numerous drugs, such as belladonna, *Cannabis indica*, arsenic, and phosphorus. He

also used counterirritation on the chest. In cases of angina pectoris associated with gout, Colchicum was administered. In the same year Martin reported on the beneficial effects of antipyrine, and Sée, four years later, recommended the same treatment. In 1892, Evans employed spartein sulphate and discussed the merits of this form of treatment. Lemoine, in 1894, advocated the administration of methylene blue.

The year 1895 marked the introduction into the treatment of the anginal syndrome of the purines, a group of drugs that are admitted to be of benefit today and which are quite widely used. Askanazy introduced theobromine sodium salicylate ("diuretin") in this year.

In 1897, Page, refuting the cardiac origin of angina pectoris, recommended pouring cold water over the abdomen or lower part of the back to relieve what he believed to be spasm of the stomach; in this connection it will be recalled that while most physicians had long associated the anginal syndrome with the heart, it was considered by many to be a functional disorder.

Bradbury, also in 1897, introduced erythrol tetranitrate, a drug which has essentially a nitrite action but which produces a less abrupt effect that is somewhat more sustained than that of the nitrites. Bostwick in the same year recommended administration of hyoscine. In 1898, Clements reported favorably on the use of *Cratægus oxyacantha* (fluid extract of English hawthorne) in the treatment of angina pectoris. This drug is still advocated by some of the older practitioners of medicine.

William Ewart, in 1899, advocated inhalation of carbon dioxide well diluted with air, apparently on the premise that the increased depth of respiration resulted in benefit. In 1902, Marshall and Wigner introduced mannitol pentanitrate, a drug similar in action to erythrol tetranitrate, but which was very slow in manifesting its effect; it is now rarely used. In the same year Strümpell advocated the following drugs for the treatment of the anginal syndrome: camphor, *Strophanthus*, chloral, and chloralamide. The basis for their employment is obvious. Also in 1902, based on the contribution of Askanazy, Kaufmann and Pauli, and also Breuer, discussed the favorable results obtained by them following administration of theobromine. In the next year Pineles reported on the use of theocin. Rumpf, in 1907, expounded the value of electric baths,

using the sinusoidal current, a procedure which did not receive much acceptance. In the same year Hasselbalch and Jacobäus advocated exposure to Finsen light. Mackenzie's treatment (1908) stressed the symptomatic value of administering chloral and ammonium bromide, in addition to a well ordered regimen.

The next contribution to the treatment of angina pectoris was revolutionary, and it was accepted by the medical world with unprecedented enthusiasm. In 1916 Jonnesco^{32, 33, 34} described his operation of cervical sympathectomy whereby the sympathetic nerve connections of the heart were interrupted, thus presumably destroying the arc of pain stimuli. Numerous modifications of this procedure have ensued, but as yet no single procedure has been presented that has uniformly resulted in success.

In 1922 Klewitz and Kirchheim, and also Niemeyer, reported the beneficial results obtained in some cases of angina pectoris following the intravenous injection of hypertonic solutions of glucose. This form of treatment is based on the presumption that the glycogen content of heart muscle, which becomes rapidly reduced under conditions of anoxemia, is augmented by such intravenous injections. The method has a definite place in modern therapeutics.

In 1923 Daniélopou,^{17, 18} with Jonnesco's work in mind, advocated resection of the paravertebral nerves. Results were variable and uncertain and various modifications of this procedure were inevitable. Mandl, in 1925, conservatively modified Daniélopou's procedure by injecting procaine, and later alcohol, into the paravertebral nerves. While this method of treatment has given variable results, it undoubtedly has a place in certain selected cases.

In 1924 Babcock recommended the use of benzyl benzoate in the treatment of the anginal syndrome. Babcock accepted Allbutt's concept of the origin of pain and believed that the beneficial action of benzyl benzoate resulted from the relief of spasm in some part of the vascular system, so that the pressure within the aorta was lessened, thus preventing tension on the diseased walls.

Hay and Ince in 1926 recommended diathermy, and this mode of treatment was tested quite thoroughly. The results, however, were not encouraging so that it has now been quite generally abandoned. Ecker, a year later, discussed the

ANGINA PECTORIS—WILLIUS

TABLE I. VARIOUS METHODS OF TREATING ANGINA PECTORIS

Year	Author	Country	Treatment
1768	Heberden	England	Quiet, warmth, spiritous liquors, opium, counter-irritation
1776	Fothergill	England	Essence of peppermint, to promote eructation
1790	Alexander	England	Arsenic solution
1792	Perkins	England	White vitriol (zinc sulphate)
1809	Schlesinger	Germany	Extract <i>Lactucae virosae</i> (lettuce leaves)
1817	Reid	Ireland	Inhalation of oxygen
1826	Laennec	France	Venesection
1829	Mantell	England	Venesection and a seton
1832	Newton	Ireland	Hydrosulphureted ammonia
1834	Batten	England	Venesection and belladonna
1840	Munk	England	Sulphur
1841	Schlesier	Germany	Dilute hydrocyanic acid
1841	Szerlecki	Germany	Subcutaneous injection of morphine acetate
1846	Latham	England	Laudanum
1854	Stokes	Ireland	Draughts of chloroform, spiritous liquors, ammonia, Hoffman's anodyne (compound spirit of ether)
1857	Gripouilleau	France	Counterirritation
1864	Piorry	France	Quinine sulphate
1867	Brunton	England	Inhalation of amyl nitrite
1867	Trousseau	France	Atropine, alcoholic infusion of mint
1869	Rockwell and Beard	U. S.	Galvanic current
1873	Papillaud	France	Potassium bromide
1876	Balfour	England	Iodides
1879	Murrell	England	Nitroglycerin
1880	Dieulafoy	France	Ice bag
1883	Hay, Matthew	England	Sodium nitrite
1883	Jakubovski	Russia	<i>Viburnum opulus</i>
1885	Mangub	Russia	<i>Viburnum opulus</i>
1886	von Noorden	Germany	Cocaine
1886	Laschkevitch	France	Cocaine
1887	Huchard	France	Iodine
1889	Broadbent	England	Belladonna, <i>Cannabis indica</i> , arsenic, phosphorus, counter-irritation, <i>Colchicum</i>

TABLE I. VARIOUS METHODS OF TREATING ANGINA PECTORIS—*Continued*

Year	Author	Country	Treatment
1889	Martin	U. S.	Antipyrine
1892	Evans	U. S.	Sparteín sulphate
1893	Sée	France	Antipyrine (phenazone)
1894	Lemoine	France	Methylene blue
1895	Askanazy	Germany	Theobromine sodium salicylate ("Diuretin")
1897	Page	U. S.	Water
1897	Bradbury	England	Erythrol tetranitrate
1897	Bostwick	U. S.	Hyoscine
1898	Clements	U. S.	Crataegus oxyacantha (English hawthorne)
1899	Ewart	England	Inhalation of carbon dioxide
1900	Steele	England	Inhalation of oxygen
1902	Marshall and Wigner	England	Mannitol pentanitrate
1902	Strümpell	Germany	Camphor, Strophanthus, chloral, chloralamide
1902	Kaufmann and Pauli	Austria	Theobromine
1902	Breuer	Germany	Theobromine
1903	Pineles	Austria	Theocin
1907	Rumpf	Germany	Electric baths with sinusoidal current
1907	Hasselbalch and Jacobaus	Germany	Exposure to Finsen light
1908	Mackenzie	England	Chloral, ammonium bromide
1916	Jonnesco	France	Cervical sympathectomy
1922	Klewitz and Kirchheim	Germany	Intravenous injection of hypertonic glucose solution
1922	Niemeyer	Germany	Intravenous injection of hypertonic glucose solution
1923	Daniélopou	France	Resection of paravertebral nerves
1924	Babcock	U. S.	Benzyl benzoate
1925	Mandl	Austria	Injection of paravertebral nerves with procaine and alcohol
1926	Hay and Ince	England	Diathermy
1927	Ecker	U. S.	Roentgen rays
1929	Vaquez, Giroux and Kisthinos	France	Insulin-free pancreatic extract
1933	Blumgart, et al	U. S.	Total ablation of thyroid gland
1935	Beck, et al	U. S.	Transplantation of pedicle flap of pectoral muscle to the heart
1935	Krantz, et al	U. S.	Inhalation of trichlorethylene

possibilities of roentgen therapy, but there has been no general acceptance of this method either. In 1929 Vaquez and his associates advocated the subcutaneous injection of insulin-free pancreatic extract. The vasodilating effect of this and other tissue extracts has been clearly demonstrated, but although this form of treatment is effective in some cases, its routine employment cannot be advised.

The applicability of surgical methods to the treatment of the anginal syndrome was again advanced in 1933, this time by Blumgart and his co-worker.^{7, 8, 9, 10, 24} They recommended total ablation of the thyroid gland. This procedure is based upon sound physiologic principles which in brief consist in reducing the circulatory demand by lowering the basal metabolic rate. While this method of producing symptomatic relief has resulted favorably in a considerable number of cases, a procedure of this magnitude, which is attended by an appreciable risk in its execution, is destined to lose popularity and to remain a form of treatment for only a selected group of patients.

Beck and his associates in 1935 reported the transplantation of a pedicle flap of the pectoral muscle to the epicardium, in the hope of establishing an extrinsic blood supply to nourish the heart and to supplant and augment the impaired coronary circulation. Sufficient data are not available at this time to judge thoroughly the merits of the operation. In 1935, also, Krantz and his associates called attention to a simple method of relieving the anginal syndrome. They advocated inhalation of trichlorethylene, a drug that appears to have a sedative action which influences the basal ganglia. While it does appear to have a sedative effect of fairly sustained duration, it does not appear to have any effect on the immediate attack.

This historical survey embraces a period of 168 years, during which a different method of treatment or the introduction of a new method or drug appeared on the average every two and a half years. It is interesting to recall that, in addition to other remedies, Heberden in 1768 stressed the fact that spiritous liquors were helpful in relieving an anginal attack, an expedient that today is still utilized by some patients. Opium and its derivatives were likewise pioneers in the treatment of this disorder.

Surgery as a method of treatment did not

appear for a century and a half, when Jonnesco introduced cervical sympathectomy, and in the ensuing nineteen years it attained considerable popularity. Its continued application to the treatment of angina pectoris, however, remains a question for time alone to answer.

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TREATMENT OF BEHAVIOR PROBLEMS, PARTICULARLY DELINQUENCY, IN EUROPEAN CLINICS VISITED DURING SUMMER OF 1935*

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THE trip to Europe being reported was made in the summer of 1935 to study behavior conditions, and especially juvenile delinquency, in the various European countries.

In Switzerland a school teacher, Hans Zulliger, was seen at Ittigen-Berne. Zulliger is particularly interested in delinquency. He has been connected with the Swiss Psychoanalytic Society for many years and has done excellent work in emotional aspects of delinquency. He has become quite an authority on the problems of

behavior presented by the poorly adjusted school child and has written articles and books on this subject. He is also especially interested in the Rorschach Test, which, until recently, was little used in this country. During the past few years several psychiatrists and psychologists have been studying this test and have been describing their conclusions in journals devoted to behavior. Those who are interested will find references in the *American Journal of Orthopsychiatry*. This test is said in a concise way to give a clear picture of the emotional makeup of individuals who are disturbed. The tests were originally

*Abstract of paper read before the Ramsey County Medical Society, St. Paul, March 30, 1936.

given to psychotics and were later applied to all types of behavior disorders.

Frau Doktor Behn Eschenburg was seen in Zurich. Her husband was a famous psychiatrist who also had done a great deal of work with the Rorschach Test. She is interested in emotional problems in children and is a member of the Swiss Psychoanalytic Society. She has recently been assigned to the task of educating all the normal school teachers with respect to the emotional development and conflicts in the pre-school and school age child. This is the first attempt in Switzerland to give prospective school teachers a clear picture of the emotional needs of the child. It is a wise step and could to advantage be adopted in this country also.

In Vienna most of the time was spent with Anna Freud and August Aichhorn. The writer had worked with both of these people for a period of a year and a half in 1930-31. He took this occasion last summer to review with them many of the puzzling problems of neurosis and delinquency which were being studied at the Child Guidance Clinic in St. Paul. Interest in juvenile delinquency has grown considerably in psychoanalytic movements during the past five years. Many interesting research studies are being carried on and the results of these studies should be valuable. Dr. Hoffer, editor of the journal *Zeitschrift für Psychoanalytische Pädagogik*, has had charge of a small institution for delinquent boys whom he is studying intensively.

Twelve days were spent in Russia. Juvenile delinquency has diminished considerably according to those in charge of this work in Moscow. This can be understood in the light of the fact that attempts have been made to remove the environmental causes for delinquency. Neglected and dependent children have been grouped together and placed in institutions where they have been given special vocational and academic training. Heavy fines have been placed on parents who neglect their children. Play and work facilities have been created to the extent that the large percentage of what formerly constituted a delinquent population are now being seen and helped by socially minded individuals. The Government has taken active steps toward reducing juvenile delinquency and has turned over to the institutions their most gifted pedagogues. This is in contrast to many places where the weakest

teachers are assigned to the delinquent and defective groups. The Russians are so impressed with the results of their efforts that many of them have lost sight of the fact that there are problems other than environmental ones which may cause delinquency. They admit that organic pathology of the nervous system can cause impulsive, delinquent behavior but refuse to accept the explanation that emotional conflict is in any way responsible for delinquency. This is only the opinion, however, of some of their experts. Two or three capable psychiatrists who were seen in Leningrad took exception to this point of view and agreed that emotional conflict very often is a strong motivating factor responsible for delinquency.

Lubertzy Commune was visited. This represents Russia's attempt to socialize the promising delinquents. It is a step between institutional life and return to society. The prisoners are given a great many privileges, including that of marrying and having children, learning a vocation and earning the same wages as those in the larger cities.

Stockholm is quite progressive in the treatment of behavior problems. They have two Child Guidance Clinics. One of them is connected with the Child Welfare Board; the other is a part of the Pediatrics Section of the University Hospital. One of their important problems in delinquency is that of illegitimacy. Roughly, a third of the births in Stockholm are said to be illegitimate. One is not surprised, therefore, to find that there are a great many criminal abortions carried on, since abortion is not a legal operation there. (It is in Russia.) A reliable source stated that at one time half of the beds in a good hospital were filled with abortion cases. An intelligent approach to the problem of delinquency has been made in Sweden. A psychopathic ward has been constructed at the State Prison at Longholm and all major criminals are observed here for one or two months before they are brought to trial. Doctor Nordal is particularly active in this work. He is also in charge of the Child Guidance Clinic at the University and is responsible for the teaching of abnormal behavior in children to the medical students, doctors, legal students and lawyers.

Copenhagen is not nearly as advanced with regard to the care of the delinquent or abnormal

child. Those who were interviewed ascribed this to the fact that the Department of Psychiatry has been primarily interested in organic pathology and not in functional illness. The neuroses and psychoses have received relatively little consideration. The country is overfilled with institutions of all sizes for every type of problem; only a certain percentage of these are efficiently managed. It is unfortunate that the expense necessary to carry on these institutions has made it difficult to establish Clinics that can study intensively individual cases.

Amsterdam is very progressive in the treatment of juvenile delinquency. They have an excellent Child Guidance Clinic whose staff has been trained in New York and in London. The writer had worked with two of the members of this staff in New York. Their results are encouraging. They have a good juvenile court, schools for social work (Stockholm also has a good school for social work), and an organization of psychiatrists who are very much interested in functional conditions. Dr. van der Hoop gives to the medical students a course of twenty-four lectures devoted entirely to the neuroses. Most of the psychiatrists in Amsterdam are analysts. Some of their younger men are interested in the treatment of the conflicted delinquent.

It is probably not generally known how progressive Belgium is in the treatment of delinquency. They established the first Juvenile Court in Europe, and their present court could be used as a model by any progressive country. Every juvenile delinquent brought before the court is given a social, psychological, physical and psychiatric study. Every adult who has committed a crime serious enough to demand a grand jury investigation is given a similar study. One of the psychiatrists interviewed was amazed to find this was not a general procedure in America. He wondered how any judge could assume the responsibility of handling a case when he could not get consultation from the psychiatrist, sociologist and psychologist. Every large prison throughout Belgium has its psychopathic department. The prisoner is assigned to a branch of service which will interest him and which will be most helpful towards rehabilitating him. The psychiatrist helps to determine whether or not it is advisable for the prisoner to leave the institution. Every case that has received psychiatric help in the prison must be followed up

in a Dispensary for Mental Hygiene conducted by the Red Cross. There are six large dispensary units of this kind in Belgium.

Those who are interested in the treatment of the mentally retarded and harmless psychotics will enjoy visiting the community of Gheel in Belgium. These people are allowed to board in private homes and have made surprisingly good adjustments.

London is handling problems of delinquency and abnormal behavior very much as we do in the larger centers in America. There are six or seven Child Guidance Clinics in London, including the large London Child Guidance Clinic supported by the Commonwealth Fund of America for the training of psychologists, psychiatrists and psychiatric social workers. The juvenile courts are run quite similarly to ours. Their probation is not nearly as well developed as ours. They, as well as other centers in Europe, regret very much the fact that they have not developed foster home care for their delinquent young people. They are quite envious of the work being done in this country in foster homes and hope eventually to develop such a program.

One outstanding experiment is being carried on in London with reference to delinquency. An organization was formed two years ago known as the Society for Scientific Study of Delinquency. About twenty psychiatrists and sociologists constitute the membership of this organization. About half of the psychiatrists are psychoanalysts and every one in the group is interested in the emotional factors which may be responsible for crime. A small institution is being built in the country where a limited number of juvenile delinquents can be given intensive psychiatric study. This approach to the problem of delinquency is badly needed in every country in the world, and we shall look anxiously for the conclusions which will come from their investigations.

This description affects only the high spots, and there are undoubtedly many experiments in juvenile delinquency which are being conducted in the countries that were visited which were overlooked because their existence was not known to the writer, or time did not permit it. It was very interesting to note that wherever one visits, the problems of delinquency are quite similar. The same kinds of behavior patterns manifest themselves as a result of the same kinds of physical, environmental and emotional factors.

THE SOCIAL ASPECTS OF DELINQUENCY*

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A STUDY of the social aspects of juvenile delinquency shows that the problem of crime is really a problem of adolescent youth, environment, unemployment, and improper use of leisure hours. Almost every criminal career begins with juvenile delinquency and every criminal career is progressive. The old saying, "as the twig is bent so the tree is inclined," is very applicable to the question being discussed this evening. Usually the criminal career begins with the juvenile rowdy, i.e., the tag-a-long who commits acts of vandalism to win the applause of older boys. He soon graduates into petty thievery, one offense leading to another, and finally progresses into grosser crime, ending in the creation of a confirmed criminal.

Only about one out of every ten criminals is arrested or detected so it must be obvious that we never can possibly apprehend all of them. Therefore, the theory that we can check crime by arresting a few of them at the top and bringing back the lash and capital punishment is absurd. So frequently getting into court is a matter of chance and of family and social resources. One juvenile delinquent might "get by" for some adventitious reason, and another, probably less dangerous to the community than the first, be penalized. Every year about 200,000 juveniles pass before the courts on delinquency charges¹ but many others never get to the courts because of various different combinations of circumstances. Some are in rural districts which are poorly supervised and loosely organized for the control of delinquency, some are from wealthy families with "pull," and still others are set right by teachers, parents, or clergymen. There are no figures to show that juvenile delinquency is on the increase. At regular intervals there occurs a great deal of agitation about "Youth and the Crime Wave," but this is for the most part without foundation.

Authorities on crime prevention agree that the passing of new laws or the creating of new courts will not diminish crime. We hope to pre-

vent crime by beginning with the *finished criminal*. We develop superior police methods and various techniques of punishment which cause us to lock up a few dangerous men or deter others through fear, but these results are only temporary. They are only temporary because repressive methods are bound eventually to grow lax and the ubiquitous potential criminal is always ready to become active. Crime is a symptom and not a disease or a cause. It is a rebellion against the laws of society, and is a rebellion which can be traced to selfishness, thoughtlessness, or a spirit of adventure. Sheldon Glueck, professor of criminology at Harvard Law School, says that in order to diminish crime we must wage a basic attack against the *fundamental causes*. Educated people are beginning to realize that any crime prevention program must be closely related to the whole problem of dealing with the juvenile delinquent. One of the fundamental causes of major crime is juvenile delinquencies. We must remember that in dealing with the juvenile delinquent we are not dealing with a strange creature but we are dealing with a pattern of human behavior that has developed in the social process in a direction that makes it at variance with the standards of society.

According to Dr. L. G. Brown,² professor of sociology at Ohio Wesleyan University, there are four statements that serve as a frame of reference in attempting to understand delinquent human nature and the social factors involved.

1. Delinquency, like any other behavior pattern, is an adjustment to a social situation. All that the individual has at birth is a random behavior capital with no aim toward adjustment. It is not any more natural *not* to steal than to steal, *not* to lie than to lie, and it is no more natural to be non-delinquent than it is to be delinquent. Delinquency or non-delinquency is a product of sociology and not of biology.

2. The delinquent or criminal as a social type is produced by identically the same social process as the non-delinquent. As far as the new-

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born is concerned there aren't any such things as property, human rights, womanhood, honor, chastity, or laws. These objects, both concrete and abstract, come into his world through experience, which is a social process. Through this social process these entities become social objects. The child's conception of the social objects in his world develops from the attitudes that experience causes him habitually to assume toward these objects. Thus, property may become an object to protect or an object to destroy, merchandise may become an object to steal or an object to buy, human beings may become objects of altruism or objects of exploitation, and God may be worshipped or blasphemed. The difference between a criminal and a law-abiding citizen is the difference in the manner in which social objects have been acquired and defined.

3. A delinquent or criminal pattern of behavior is not any harder to change than a non-delinquent pattern of behavior. Try to break up the habits, attitudes, and the interest that a normal non-delinquent child has in baseball, football, or any other of his pet hobbies. Select ten physicians, ten lawyers, ten clergymen, and ten criminals all equally interested and habituated in their professions and you will find it equally hard to change the life pattern in each group.

4. Whenever one finds a delinquent or a criminal, there he finds a delinquent or a criminal social situation. What are some of these delinquent or criminal social situations tending to cause and promote juvenile delinquency?

The Home.—Judge Herbert G. Cochran³ of Norfolk, Virginia, finds that 90 per cent of the cases of juvenile delinquency appearing in his court were traceable to an unsatisfactory home situation, and 80 per cent of all delinquent and unlawful acts are committed by children away from their homes. Greenhill⁴ states that the bulk of delinquents are the victims of misfortune to their parents or to their homes, i.e., premature or early death of one or both parents, accidents, chronic illness, poverty, unemployment, nervous and mental disorders, and broken homes. Any reduction in the frequency or any mitigation of the consequences of these will automatically result in the prevention or mitigation of delinquency. The development of preventive medicine, public health measures, mental hygiene movements, workman's compensation laws, un-

employment insurance, and domestic relation courts should be considered as a means to this end.

The problem of the "second generation" is an important one in juvenile delinquency. By this is meant the American-born children of foreign-born parents. The immigrant parent himself is not the potential criminal. He is an honest type who has given up the language, customs, traditions, and security of his home-land in order that he may come to America where his children will have a better chance. These foreign-born parents live in two or three rooms in tenements amid squalor, poverty, and filth. They live in the old manner. They are poor and they don't speak English. Their children go to public or parochial schools where they are taught that all men are equal, that every boy can be President of the United States, and that one person is as good as another. They then return to their dirty homes and "ignorant" parents and begin to feel superior to them. Parental control is lost, tradition is broken down, disrespect loosens the family ties, and there is nothing to prevent the boy or girl from succumbing to the temptations which inevitably are thrown into his or her path.

The Neighborhood.—Most juvenile delinquents who become before the courts are from the poor neighborhoods, the so-called interstitial areas which are the down and out districts unsuitable for residential purposes, where factories encroach upon homes, and the poorer, less desirable, less intelligent, less ambitious down-and-outers go to live. These areas are veritable incubators for juvenile delinquents. They have been defined for twenty or more American cities of different types, usually by means of spot-maps, and are characterized by physical deterioration, decreasing population, high rates of delinquency, high percentage of foreign-born and negro population, and high rates of adult offenders.⁵ According to Dr. Frederic M. Thrasher,⁶ associate professor of education at New York University, in these areas the nationality composition of the population changes almost completely in twenty years, but the delinquency rate remains constant. This tends to support Professor Brown's contention that crime is more a matter of sociology than of biology.

Physical and Mental Conditions.—According to figures cited by Greenhill⁴ one-fifth of all our

preschool children are undernourished, mentally defective, or in need of medical care. Of our 45,000,000 children, 15,000,000 are physically handicapped. Of these, 3,000,000 have impaired hearing, 65,000 have defective vision, 1,000,000 have speech defects, 300,000 are crippled, 1,250,000 either have tuberculosis or are tuberculosis suspects, 450,000 have damaged hearts, 2,500,000 have some neuropsychiatric disorder, and 6,500,000 are mentally deficient. Only about one-fifth of the above are being taken care of, leaving about 12,000,000 who by even the most optimistic thinkers cannot be ranked very high as the hope of the nation.

Gangs.—The gang has its roots in the oldest social organization known to man, namely, the tribe. The acts of its members are motivated by primal natural instincts which are too strong to be submerged. Delinquents frequently go in groups (Lippman⁷) because the group offers them the best medium for their delinquent impulses. Here there is little or no emotional restraint and the gang offers to the individual that which he never can realize when alone. Gangs inevitably grow out of street life and are associated with undesirable social or athletic clubs which serve as clearing houses for all sorts of demoralizing information, attitudes, and habits. They act as foci of social contagion.

Along with the gang there exists for boys and men the hang-out, which is merely an adjunct of the streets and may be equally demoralizing. It may be a confectionery store, restaurant, shoe shop, bakery, garage, moving office, or any one of a number of different types. It is a known fact that in certain areas of New York City one gang will boast because more of its members have gone to Sing Sing than from some rival gang.

Truancy.—When the child enters school he enters a new world and faces new conditions. However, the fact that practically all juvenile delinquents are children of school age doesn't mean that the school itself is responsible for their delinquency. The revolt at this age may be an indication of some deep-seated difficulty which has its roots in the child's past or in his home environment. The school must realize that the child it teaches has a life outside of that which is passed in the class room.

Hoey,⁸ looking over the life histories of 145 men committed to the New York state prisons

during two months of 1927, found that a large number of them had had their first contacts with the law as persistent truants from school sometimes at an early age. They were committed to schools for truants, had graduated to children's "protectories," from these were promoted to reformatories, and finally arrived at state prisons. Nowhere along the line had any adequate individual study been made in any case with a view to determining the underlying cause of the delinquency.

The above study was made of adult criminals and Miss Hoey became interested in facts concerning boys who were about to be committed to a school for truants. She investigated the histories of 201 such boys and found a striking similarity to the histories of the adult offenders. Both juveniles and adults came from the same type of home, the same poor neighborhoods, had experienced similar difficulties in school, had failed grades, and had been made to repeat the same subjects, term after term, finally escaping from the situation by running away from school and finding outlets in undesirable pursuits. None of the boys or the adults had been subjected to any adequate scientific study as to their mental capacities, aptitudes, or interests.

In looking over the subsequent careers of 251 boys who had graduated from truant schools, six to eight years previously, it was found that 51 per cent had become delinquent. This does not mean that the remaining 49 per cent became socially conformed, because of this number a great many were lost trace of through change of residence, failure to locate, and so forth.

In connection with a consideration of truancy a few facts relative to the state of the schools resulting in illiteracy, lack of vocational guidance, and lack of understanding of the individual child are interesting.⁴ In 1934, the schools in this country had 25,000 fewer teachers than they had in 1930, but there were one million more pupils. Building had decreased 80 per cent and the purchase of books, 20 per cent. Terms had been shortened in 25 per cent of the cities and towns, and 5,000 schools had been closed altogether. Further, in spite of the fact that 15 per cent of the school population is in some way mentally handicapped or definitely feeble-minded, the special classes for handling these children have been vastly reduced. Small wonder that truancy still is a major problem!

Child Labor.—Until recently child labor has been a great contributing cause to juvenile delinquency. Children were being forced to work under conditions designed for adults and which frequently were difficult for adults themselves to cope with. The children were forced to do work beyond their physical capacity and to labor long hours under the most unhygienic conditions for a pittance. In New York State, 4,252 boys and girls were found to be illegally employed in factories and mercantile establishments in 1928, and 845 of these were under fourteen years of age.

In addition to child labor in mills and factories, the so-called "street trades" contribute greatly to juvenile delinquency. This means the newsboys and telegraph and messenger boys. Many of these boys come from broken homes and are free from control and restraint. They frequently begin to gamble and go to improper places for amusement and often from that to stealing and disorderly conduct. "The streets and the institutions of the streets grant no degrees and give no diplomas but they educate with fatal precision."⁶

Newspapers and Magazines.—Printing lurid crime stories illustrated with objectionable pictures only tends to stimulate the depraved. In a recent number of the *Minnesota Prison Mirror*, a newspaper published by the convicts at the Minnesota State Prison, it was stated that "the newspaper of today is the chief disseminator of information on criminal methods. It is the thief's text-book and every robbery it details is a new lesson to him." Judge Cochran³ cites the case of a quite clever boy of fifteen who was brought before him charged with committing several thefts and burglaries, some of them with the aid of firearms and of rubber gloves to avoid leaving fingerprints. He told the judge that he had learned how to pull his jobs by reading in the daily paper of the exploits of one Richard Reese Whittemore, a notorious bandit and murderer who had been executed in Maryland.

Magazines devoted to the exploitation of sex and containing accounts of crimes of violence and the activities of gangsters are avidly read by a large part of our juvenile population, and in my opinion are inimical to the development of that degree of emotional stability necessary to

withstand the stress and the strain of modern life.

Commercial Amusement.—With the mechanization of labor and with the closing of factories as a result of our financial panic, there has been a tremendous increase in the amount of leisure time on the hands of juveniles as well as adults. Idle time hangs heavy so there has grown a widespread demand for enjoyable ways of spending it. This has resulted in the extraordinary expansion of business engaged in providing recreation on a commercial scale. Some of these businesses are highly organized and under the control and direction of individuals interested not in sociology, morality, or social psychology, but in financial profit. Vaudeville and burlesque shows, cabarets, night clubs, beer taverns, pool rooms and amusement parks have long been under the control of commercial interests not interested in the problem of delinquency. The most recent and the most potent influence has been the movies.

In a very interesting book called "Movies, Delinquency, and Crime," by Blumer and Hauser⁹ one finds the results of an exhaustive study conducted among the inmates of various houses of correction with a view to determining how large a part the movies played in the causation of delinquency of various types. Numerous case histories are given and interviews with inmates recorded in which it is clearly shown that sex delinquencies were the direct result of the so-called "hot" movies. Any number of girls and boys in their mid-teens are sexually aroused for the first time by salacious and lewd pictures. Many use the movies as a means of enticing an innocent member of the opposite sex to accede to their wishes. In 1930, crime and sex were the main themes in three-fourths of all the pictures produced, while mystery pictures and war pictures largely concerned with violence were next in frequency.

According to Blumer and Hauser, thirty-one different criminal techniques were learned from the movies by the prisoners studied. Among these techniques were how to open a safe by the "feel" of a dial, how to enter a store by forcing the lock with a crow-bar and screw driver, how to cut burglar alarm wires in advance during the day, how to take a door off its hinges and force way into apartment, how to break a window noiselessly by pasting fly paper

on the glass before breaking it, how to use a brace and bit to drill out a lock, how to use a glass cutter to get at a window lock, how to rent an apartment for a gang hide-out, how to force an auto door with a piece of pipe, and twenty-two others.

Recognizing some of the social forces concerned in the production of juvenile delinquency, psychiatrists, sociologists, economists, and law-enforcement officers have come to the realization that in juvenile work the idea now is to save rather than to punish the child. The approach to the problem should be on several fronts and the program is clearly, completely, and succinctly outlined in publication Number 215 of the Bureau of Publications, United States Printing office, 1935, called, "Facts About Juvenile Delinquency, Its Prevention and Treatment." Time does not permit a detailed discourse of these approaches, but they fall into four main groups: (1) the education of public opinion, (2) assistance to parents in dealing with early behavior problems, (3) social work in the schools, and (4) development of community influences and proper supervision of leisure time and activities.

Education of Public Opinion.—Public opinion must not "view with alarm," throw up its hands and cry for more stringent laws. It must be taught to give its support to a well-rounded and co-ordinated community program for the study and prevention of juvenile delinquency. Since the spirit of the community reaches after the child and brings the outside world into home life through the media of the press, the radio, and the movies, public opinion should be directed to demand the right attitude toward the enforcement of laws on the part of prosecutors, courts, and juries, for the protection of children.

Assistance to Parents in Dealing with Early Behavior Problems.—There is no substitute for home life and intelligent parenthood in the rearing of children. Through the promotion of a more wholesome home life, general education of parents in child care and training, early diagnosis of behavior problems through the establishment of habit clinics for the pre-school children and child guidance clinics for the older ones, a large number of children otherwise destined for delinquent behavior can be materially helped.

Social Work in the Schools.—We have seen how chronic truancy plays an important part in juvenile delinquency. By setting up adequate

health services, attendance departments manned by able and well paid officers, visiting teachers, special classes for the handicapped, programs for educational and vocational guidance, it should be possible to reduce juvenile delinquency by mitigating the problem of truancy.

Community Influence and Leisure Time Activities.—As the child grows older, more and more time is spent away from the home and the school in what is known as "the community." The child's home, school, church, or job cannot satisfy his budding curiosity and his need for new experiences, adventure, and achievement. He, therefore, turns to the community for this satisfaction and the community may help to make him strong and able to meet life squarely, or it may help to make him dissatisfied with his environment, rebel against it, and become a juvenile delinquent. The abuse of leisure time opportunities in the community constitutes a negative situation which acts as a criminogenetic factor in that it makes possible the operation of positive influences which promote delinquency and crime. The community should provide recreational facilities under public auspices (playgrounds, swimming pools, libraries, and so forth), leisure time activities under private auspices (boy scouts, girl scouts, camp fire girls, church clubs, boys' clubs, and so forth), and protective work. In this latter field special attention should be paid to commercial amusements, the control of which is centralized with the eye to box-office receipts rather than to child health and protection.

It is only by attacking the situation broadly and striking at the very roots of the problem by applying causal treatment that we can hope to cope with the burning question of juvenile and adult criminality.

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FACTS AND FANCIES HAVING SOME BEARING ON THE PSYCHOLOGY OF THE DELINQUENT CHILD*

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THE question of the responsibility of children brought before the court for delinquent acts is an important one, and at present a far more inquiring attitude is displayed by Juvenile Court officers, social workers, and psychiatrists, in their approach to it, than was formerly the case. A serious effort is now made to discover the cause of the delinquency, whereas the delinquent child was once summarily dealt with as one who knew right but did wrong.

In looking over studies made in the attempt to find the cause of delinquency, it is at once apparent that there are a great number of factors present in every case. This very complexity permits every layman to have his own pet ideas about the matter, and they embrace such factors as natural wickedness, constitutional make-up, environmental influences, parental mistakes in up-bringing, lack of church attendance, and the failure of our present system of educating children.

Healy¹ studied as controls a group of children who had not become delinquent and who lived in the same families and under the same general conditions, as some delinquent children, and found no single reason for the misbehavior of the delinquents. In the non-delinquents there was always a group of factors working together for better conduct trends. Certain needs, wishes, and urges that belong to the individual, find outlets and satisfactions even in unfavorable environment, and there are such variations even among the non-delinquents that it was impossible to make a category of the causes of their normal social behavior. The disinterestedness of this particular study is indicative of the fair-minded attitude which many psychiatrists are bringing to the study of conduct disorders, and the psychiatrist's method of study is probably the most direct way of learning the cause of the trouble in the individual case, that is, by studying the mental life of the child and gaining understanding of how he feels about people and things, and what thoughts are in his mind.

Now, some people may not be in sympathy

with this method of studying misbehavior, feeling that punishment is the best means of checking it. Furthermore, and in spite of what well-meaning theorists may say to the contrary, fear of punishment does deter from misbehavior up to a certain point, but that it does not entirely do so will also have to be acknowledged. The adage of "once a thief, always a thief," seems to express this idea. In fact, the most amazing repetitions of criminal acts seem quite commonplace. In some instances the power of the gang with its political protection and ramifications with rackets, dope and prostitution, may, either by contact or example, lead the youngster into a criminal career. In other cases the pressure of social life upon weak or suggestible minds that are unable to stand up against the temptation to steal automobiles or indulge in other forms of larceny seems at fault. Again, misbehavior sometimes seems to be in the nature of compulsion. Weak court attitudes toward punishment, combined with the connivings of criminal lawyers, too, undoubtedly give many young criminals the impression that even if they are detected their sentence will not be severe, or will be modified in some way.

It may be that some people think the psychiatric study of a case is just another attempt to modify or lessen the penalty. On the other hand no thinking person would hold that a fellow who committed a crime which was the expression of a delusion, due, for instance, to paresis, should be punished for it, or that the punishment was going to cure the disease; or that punishment would cure feeble-mindedness, organic brain disease, a developing case of dementia precox, or any other mental disorder which expressed itself as a misbehavior. If such an afflicted person were punished, would it not be likely that after he was released he would repeat his crime?

This view of the repetition of criminality, that is, that the repeater might be suffering from a mental disorder led to the drafting and passage of the Briggs law in Massachusetts. It provides that a person indicted for capital offense or indicted for a felony more than once

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shall be reported to the Department of Mental Disease to determine his mental condition, and the existence of any mental disease or defect which might affect his criminal responsibility.

The study of this department and of hundreds of independent investigators interested in the matter of delinquency has disclosed much that is enlightening in the psychology of the criminal. As an example, the case of a boy subjected to a great deal of attention, affection, and consideration from his parents may be given. He was a well mannered, not very active, fleshy boy. About puberty he began to wonder if he had been made a "sissy," and set about to prove to himself that he had not. He began by stealing automobiles because he felt that his school fellows would be afraid to do such a thing. Later he tried burglary. There was absolutely no necessity for either of these acts, excepting as the necessity was present in him.

Alexander and Healy⁸ have found by their investigations that some criminals' careers develop out of personality weaknesses and lack of accomplishment in other directions. The feeling of being engaged in adventures that many would fear to undertake wonderfully "bolsters up" the ego.

This adventurous type of delinquency is easily understood, and it seems somehow to strike a responsive chord, otherwise we should not be so interested in the careers of notorious criminals. In our modern days we have no frontier, no opportunity for youthful adventures at sea, and the youth of the nation is not worked as it was in the days of apprenticeship, consequently, the exuberant impulse of adventurous youth is turned too often to crime.

Less easily understood is the manner in which the controls of conduct, the moral and ethical senses, arise and develop within us and help us to become an accepted part of the social group. Some of these conceptions will have to be expressed dogmatically. We must begin with the small child who is without social or ethical consideration in his conduct. In the earliest years of his life he is entirely dependent upon his parents, who direct his activities both for his own welfare and so that his activity and presence will not interfere too greatly with the comforts of the rest of the family. Very gradually these restrictions weave a pattern for the child to follow, and the child senses what in his conduct

pleases or displeases his parents. During this stage the child begins to form an idealistic picture of his parents, based upon an imagined perfection in them, fostered, of course, by the affectionate attitude of the parents toward him. Upon this idealized picture of the parents and his love for them the child patterns that inner guide, his conscience, which tells him the difference between what is right and what is wrong in his conduct. As a result of this situation, it would seem as if lack of affection of the parent for the child, or a poor idealization of the parent by the child, might seriously distort or impair the development of the scruples which are later to govern his social conduct.

This statement of the manner in which the child developed these social scruples is the barest outline of facts. It does not take into consideration other and perhaps equally important factors, such as heredity, as they relate to the stability of the nervous system, intelligence, the degree of reaction to emotional stimulation, the general type of body structure, and the general health of the child, any of which may influence or modify the love of the parent for the child. Such physical characteristics as beauty, or deformity, or ugliness, may conceivably cause over-protection or rejection of the child with far reaching effects upon his character. In the matter of the adventurously delinquent boy, we have indicated one effect which over-protection may have upon the child.

This overindulgence of the child is not a matter that takes place overnight. It is present from a very early age and there are years of it. Likewise, when a child feels that his parents have rejected him, it is not that they have told him directly that they do not love him, it is rather that after years of criticism or punishment for perhaps some defect which the child was not instrumental in producing and has no means of remedying, the child finally feels that he is not loved. The repetition of this type of injury to the child's self esteem may bring about personality disturbances of a grave order, and result in false attitudes toward society and, consequently, social misconduct. Rejection is spoken of as "a conflict situation." Let us follow the working of a very simple case, and see one of the ultimate effects it may have on the child's behavior.

In most instances, as the child is growing, the

mother assumes paramount importance in his affections. Perhaps the child in this instance is an unusually active, mischievous boy, whose exuberance is a constant source of annoyance to his mother. Conflict is open between them, and he is punished by every means at the mother's disposal, deprived of her affection, and, unjustly disciplined, naturally the child becomes rebellious. Many of the child's thoughts as they relate to his mother are bitter, uncompromising thoughts, built on the realization that he has been harshly and unjustly treated. In his mind this constant repetition of injustice may assume the magnitude of a complex so that his thoughts are largely occupied with a sense of injury and resentment.

This state of mind may conceivably be carried to a point where it distorts his personality and character to the extent that people outside the family show their dislike of the child. At this stage, everything that happens to the child is distorted by the presence of this "complex" of being rejected and unjustly treated by his mother. A moral pattern is then built up which fits a purpose.

As an example of this type of thinking, the following may be assumed: "My mother has been unfair to me, and does not love me, she is to blame for everything. She does not love me so it does not matter what I do—even if I disgrace her she would not care." Such reflections can be carried on to the point that the fear of punishment or even the child's own safety are disregarded.

The child may utter such thoughts as, "I suppose you are satisfied now that I have hurt myself, it is what you wanted." And these thoughts become a sort of maxim, which not only justifies his conduct, but places the blame where he thinks it belongs. It may be expanded as follows, "My mother is unjust to me, so what if I am really bad and do the things which displease her? What would she care if I disgraced her by being caught stealing?"

This line of thought has actually been brought out in a child who was spiteful, but there are hundreds of other reactions which may occur depending on the nature of the child. Let me cite an example given by a great psychiatrist.³ An historical personage of our time, who is still living but who has retired into the background, suffered from the maldevelopment of an arm

caused by a birth injury. It is usual for a mother to whom fate has given a sickly or otherwise defective child, to try to compensate for this unfair handicap with an extra amount of love. In this case, however, the proud mother behaved quite differently. She withdrew her love from the child on account of his disability. When the child grew up to be a man of great power, he proved beyond doubt that he never forgave his mother, but he also proved by his acts of aggression to be the most ruthlessly predatory man of his age.

To revert back to the child again whose thoughts we were following, once such a complex begins to occupy his thoughts and color his conduct, he cannot emerge from this state of mind as long as the mother's treatment continues, even if he appears willing to do so. For once the mechanism of building up a retaliation of this sort begins, it is always on the basis of a personality which is warped. Usually by this time the child has begun to compensate for the treatment he has received from the mother, and to do this he develops an overestimation of his own superiority, and spitefulness results when this superiority is not recognized by others. It suggests a wish to be recognized as a person capable of accomplishing great things. Usually, such children expand under flattery and are eager to astound; they relish notoriety.

With these brief remarks, it may be discerned that once the mechanism of defense and compensation begins to occupy the mind, many of the associations which in the beginning were the sources or motives of lines of conduct are no longer in the consciousness. A child who develops such a complex with its various effects on his character and personality can only be saved from lasting criminality by correct psychiatric handling.

Similar attitudes, though in a lesser degree, are present in young people who possess special talents in art, mechanical skill, music or literature, and who are forced to occupy themselves with mediocre means of gaining a living. They may be extremely dissatisfied and turn to crime as a means of grasping wealth which will give them security and an opportunity to express themselves.

These psychological matters have been pointed out as influencing a child with normal mentality. They may act with equal force and with much

more serious and lasting consequences on one deficient because of heredity, accident or disease or a combination of all of them.

The most understandable of the defectives are the feeble-minded, an inaccurate term, because it does not convey all of the picture of the defect. The emotions of these children are generally as inadequate as their intelligence. Many of them are unable to appreciate experience or express anything like a normal degree of feeling; some of them are subject to alternations in which apathy is followed by outbursts of emotion. In general, their conduct is the expression of a flat primitive emotionalism. It is either an attempt to hurt someone by kicking, scratching, or some other form of violence, or a pestering nagging which is an invitation to have injury inflicted on them. Because many of these emotional reactions are the result of actual organic brain dysfunctions, these children react out of all proportion to conflict situations of the most trivial nature. Now if we consider two more phases of their character, which it is generally acknowledged that they possess, that of being easily led and having a poor ability to distinguish between right and wrong, we are in a position to place this child in an imaginary environment and see what may happen to it.

According to Harrington,⁴ the mentally defective child is less able to distinguish between right and wrong, and is consequently less scrupulous. He is less apt to foresee the dangers of detection and punishment when he has committed an offense, and is therefore less deterred by fear. His fearlessness often makes him the willing tool of boys who quickly sense the irresponsibility of his conduct, and often lead him into mischief. The environment of the mentally deficient delinquent may be considered under: (1) the home; (2) the neighborhood; (3) the school; (4) conditions of employment.

1. Some phases of the family life have already been touched upon, and others are such common knowledge that there is no need to mention them. In this relation, however, it is important to know what sort of a home life the feeble-minded child is likely to have. Commonly defectives are the offspring of defectives. The mentally defective parent is not likely to be able to earn a living which will provide wholesome living conditions for the child. Neither will the parents' personal habits or ethical

standards provide a good example for the child, nor their understanding or self discipline permit them to instruct or manage him. In short, the home of the defective affords neither the example nor training necessary for the socialization of the child.

2. The neighborhood is of less importance, but Shaw and others have shown that the delinquents in big cities come largely from the slum areas. The parents of such children seldom rise above poverty and naturally gravitate to the cheapest quarters, so that it is probable that the defective child will not only have a poor home guidance but will be reared in a bad neighborhood.

3. Many of the influences and companionships to which he is exposed in the neighborhood will follow him into his school life, and this may be a phase of his life which will have a harmful influence on him. If the child is unable to grasp what is being taught in school, he is likely to develop habits of indolence, and, if he is idle, he will likely get into mischief and be subjected to rebuke and punishment. Inability to do his work and the discomfort of punishment lead to truancy, as a means of escape. He may then become a street loafer and be thrown with companions who may influence him into some form of wrongdoing for which he is arrested and sent to some institution for juvenile delinquents, where he will join the ranks of the lawless. As such, he will come to look on all representatives of the law as enemies.

4. But suppose he escapes all this, without grave wrongdoing, until he reaches the age when he is employable. During periods when employment is plentiful he may make a fairly good living at unskilled labor. Economic depression however is undoubtedly productive of crime. When a person cannot work to gain a livelihood, he may be forced to steal. At best the feeble-minded person has a poor chance in competition for a living with an ordinarily endowed one, so that his chances are handicapped from the outset, which means that too often he is out of work and so is more often tempted to crime. If he is caught and punished, his chances of being anything but a confirmed criminal are slight.

Perhaps at this point it may be well to call attention to another group of cases in which the intelligence may or may not be affected harmi-

fully, and in which the conduct of the child may lead to delinquency. Organic brain trouble of all types may have such an expression. Most everyone is familiar with the conduct disorders which occasionally follow lethargic encephalitis in children or young adults, and there has been considerable publicity given the mental defectiveness which follows brain disturbances at times in measles, in vaccination for smallpox, and sometimes in connection with mumps and scarlet fever. Wohlwill⁵ has shown that in the newborn destructive processes in the nature of encephalomalacia are common. Brain trauma at birth may provoke brain destruction and abnormal mentality without hemiplegia.

Of this group the chronic post-encephalitis case is the most easily recognized, for while there is nothing of a significant nature in their conduct, which, according to Mathew Molitch,⁶ may be characterized by the commission of every conceivable act, there are physical signs in connection with the disease. Such physical manifestations as changes in expression, posture, muscle tonus, associated movements, and ocular signs, tell the story. The changes in behavior may occur at any time, from a few days to a number of years following the attack. These individuals may exhibit all varieties of psychic states though their conduct appears especially to be of an impulsive nature over which they have no adequate restraint. In this group of organic cases, one would think that the lesion in the brain would produce pictures different from the so-called functional conduct disorders, but this is not the case. The only difference lies in the fact that while irritability and hyperexcitability resulting in increased physical activity and mental flightiness occur in both the organic and functional case, such a state is found more often in the organic group, but aside from encephalitis there are not necessarily neurological signs to indicate the actual brain involvement.

One other type of organic brain trouble which may give rise to delinquency, and which is not easily recognized, is that arising from organic injury to the brain following head injury. Actually, we know very little of the effect of the brain trauma in children. I have two such children under observation at present.

One of them did average work in school before injury. He was left-handed. After the injury he had to learn to write with his right

hand, which he is barely able to do, but he draws well with his left hand. He is unable to learn in school. His mental age is nine years and three months, I. Q. 68, chronological age thirteen years and eight months. His interests are at the instinctual play level. He has gotten into trouble.

The other child is totally unable to comprehend, and only within the last week has he been taught to count to ten. His age is seven years and four months, I. Q. 76, and his mental age five years seven months. This test does not give an accurate picture of his mental condition however. He is unable to dress himself, and I have observed him trying to put his right shoe on his left foot, then changing and after putting it on the right foot and lacing it, trying to put his left shoe on the foot which already had a shoe on it. He is exceedingly restless and active. His mother has observed that he has slept only one or two hours at night for periods of weeks at a time, but always after a short sleep he awakens, bright eyed and fresh, with pink cheeks, in contrast to the appearance of his brothers and sisters, who look pale and have lines under their eyes if they don't sleep at least ten hours in the night. His delinquency consisted of pegging stones through the windshields of automobiles at the instigation of some boys, thus displaying the fearlessness, lack of foresight, and suggestibility which so many mentally defective children show.

Just one other point in regard to these children with organically inferior brains. According to Schilder,⁷ in their reactions to conflict situations, they show poor control over themselves, and the effect of the conflicts seems to reach deeper and last longer. Consequently, in children so affected, we see very primitive conduct reactions, which because of the incomplete mental apparatus and consequent peculiarities lead to pictures of behavior which resemble the mania or depression or dementia precox of the adult.

The similarity of the organically inferior reaction to the real psychosis brings up another interesting psychiatric question. May crime be the expression of a delusion or an obsession?

A. W. Hackfield⁸ has written an interesting article on the work done by the psychiatrists at the Clinic in Zurich, on unintelligibly motivated crime which represents the delusional expression of an insidiously developing dementia precox.

He says that when a crime is committed which has no understandable motive, the criminal should always be subjected to mental examination. If he shows some of the primary symptoms of dementia precox, the crime has been committed because of the mental condition. The early recognition of this condition is of great medico-legal importance, because if the diagnosis can be established, it changes the complexion of the crime and also the disposition of the case. Such criminals, when committed to a hospital, show good remissions and are prevented from developing deteriorating psychosis. If they remain under medical supervision, signs of the progression or a relapse of the disease can be detected. If such a criminal is immediately given a major sentence, the stress of it usually initiates a deteriorating psychosis ending in a mental condition which necessitates life-long commitment. If on the other hand such a criminal is given a minor sentence, and is later released without medical supervision, he becomes a menace to the community, frequently committing major crimes at a later date.

Hackfield then discusses the outcome of thirty-two cases of criminals who committed murders. In the first group of ten criminals, all of whom committed their crimes while suffering from a latent or manifest insanity and all of whom were sentenced to the penitentiary, every one became permanently insane. In the second group of ten, all of whom showed signs of insanity but who were treated medically and not sentenced, eight have shown a good remission and are living outside of an institution. In the third group of twelve, who were diagnosed psychopathic personality of the type "moral insanity," but who were found responsible for their crimes and received sentences, in not one instance did the hardship of penitentiary life provoke insanity.

Undoubtedly it is important to recognize the fact that a crime which is committed for no understandable reason may be the expression of a delusional state in the criminal. Braun⁹ found, in a study of 716 cases of dementia precox, that 14.5 per cent of all the cases turned criminal sometime in their career.

Every psychiatrist knows that vagrants, especially those guilty of repeated petty offenses or even felonies, are for the most part suffering from some form of chronic mental disease.

It is not generally realized, however, that unexplainable acts in children such as repeated running away from home, impulsive cruelty, gross misconduct in school, unsportsmanlike pranks, larceny, pyromania, and kleptomania, and malicious mischief, may often indicate a deep rooted conflict, an incipient form of a psychosis or the presence of organic brain disease. It is far more desirable that such disorders should be dealt with while the behavior is an object of concern to the parents, neighbors, or school authorities, than after the child falls foul of the law, is confined, and forms the habit of crime. Sound researches and new conceptions of conduct disorders have amply assured us that the majority of delinquents are not individuals who are marked by constitutional peculiarities. Psychic elements have been discovered which alone explain the careers of some offenders, and so we have a clearer conception of the fundamental human needs and urges which come into play in anti-social behavior. Healy¹ and many others have repeatedly stressed the presence of obsessional impulses which lead to crime, deep-rooted obsessions which develop in children who otherwise appear entirely normal. Obsessional cases of this type are usually more solitary in their activities and ordinarily these children do not enter gang activities, although, because crime is easier with a companion, they may have one. Their compulsions to crime are apparently just as strongly defined as compulsions or obsessions encountered in routine practice.

When these children are asked to explain the reason for their acts, they seem totally unable to give any. The acts seem to be entirely impulsive, but mental examination has revealed in many such cases that there is cause for the act, either in the nature of a conflict situation, or in the presence of organic disease, or psychosis. It is in these cases that there is a splendid field for psychiatric work.

In boys the most commonly encountered impulsive act is running away from home. As far as we have been able to discern, this is always done on a basis of the wish to escape from some unhappiness there, although the same flight has been observed in epileptics, and following head injuries.

Another frequently encountered impulse is that of setting fires. It is encountered most frequently in youngsters who find themselves

placed in unbearable situations. Notwithstanding the actual impulsiveness of the act of fire setting, the pyromaniac does it with a certain refinement and premeditation, so that he is not immediately detected. He can never explain the act, but when he sets fire to the house in which he lives, it is usually because of his wish to escape from the misery he finds there. When he sets fire to property other than his home, some other reason must be sought. In some instances it is the expression of delusion. In other instances it is an unhappy sexual experience or the aspiration to be loved by an inmate of the house, which is impossible of fulfillment. Some children apparently are stimulated sexually by setting or watching a fire.

Alcohol plays a great part. Some people set a fire during some period of every spell of inebriety, without ever being able to advance a plausible reason for doing it. Menstruation seems to furnish a disposition toward the impulse. The act is sometimes preceded by distinct moodiness with anxiety, "home-sickness," or digestive disturbances. In some instances the anxiety seems to be due to the conflict between the wish to perform the act, and their morality which tells them it is wrong. In some cases they seem to be in a twilight, dreamy state, in other cases they put the impulse into effect immediately. Occasionally the impulse is followed only once, and that often about the time of puberty, the person leading a normal life ever after. In others, the crime may be habitual.

The matter of arson has been dwelt upon at some length, but what is true of it as an impulsive crime is also true of other impulsive ones, such as the impulsive poisoners among women, the "jack the rippers" in men, the pathological liars, poison pen letter writers, "peeping toms" and many others.

The criminalistic impulsive disorders, as has been said, offer the very greatest opportunity for the psychiatrist. With offenders of this type, no ordinary legal or penal measures deter. No ordinary treatment cures. Most of them are repeaters. In many cases, there is, in connection with the offense, an inner need of the individual to be subjected to punishment. As G. K. Chesterton says, "The world is filled with people who feel an inner need to be crucified, as an outward expression of atonement for their guilty anxiety."

Unfortunately with punishment comes a renewed permission, so to speak, to offend. Punishment and suffering mean nothing to such a person if it is not legal punishment. This need for atonement has its origin in a fundamental personality disorder, and is something that the proper treatment may relieve.

To briefly restate the points of this paper which should be emphasized, stress should be given to the many causes which contribute to a given case of delinquency. Instances were cited of the manner in which the parents created conflicts which resulted in distorted ideas of social conduct and personality weakness in the child. These bad beginnings in some instances lie dormant until about puberty, that period when the child's spirit is too big for its body, and it expresses itself in delinquency. In other instances, the complexes express themselves early as attempts at retaliation, in impulsiveness or perhaps obsessions. These conflict situations have a far more lasting effect on children with inferior mental equipment. The home life may exert a harmful influence both from a standpoint of mismanagement of the child, as well as a poor ethical and moral atmosphere. Environmental conditions as found in neighborhood companionships, school misunderstandings and economic difficulties were touched upon, as well as crime as an expression of insidious or frank insanity. In general terms, the substance of all this can be said in the following. The two methods of making the child conform to social requirements are the extremes of over-gratification as a means of reward, and punishment and rejection as a means of intimidation. As long as either is carried too far in the training of children, delinquency will be a product of our social life.

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REPORT ON DIAGNOSIS AND TREATMENT OF RHEUMATIC DISEASES IN EUROPE*

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I RECENTLY had the opportunity of visiting a number of clinics in England and on the continent of Europe for patients who have arthritis and of obtaining the views of about fifty of the leading European specialists on rheumatic diseases. In this report is presented a brief summary of their opinions on the diagnosis but particularly on the treatment of the more common rheumatic diseases. In this country those interested in the various forms of arthritis may differ considerably in their opinions on etiology and classification but they usually agree on their general plan of treatment. The therapeutic programs advanced abroad exhibit somewhat greater individuality.

The greatest advance in the past thirty years in the study of arthritis and related diseases has been in separating the arthritides into small groups and in distinguishing one group from the others, as clearly as possible, in the following respects: the clinical pattern, pathologic alterations, laboratory data, prognosis, and, when possible, the etiology and treatment in each group. This process of definition must continue. However, clinicians seem to have strayed at times from the path provided by precise pathologic data and to have described clinical entities for which convincing pathologic or laboratory support is to date lacking. I refer to the establishment in Europe of such poorly defined entities as "tuberculous rheumatism" (in contrast to tuberculous arthritis), "endocrine or polyglandular arthritis," and so forth. It remains to be seen whether they can be placed on a more solid foundation than at present.

Chronic Atrophic (Rheumatoid, Infectious) Arthritis

In this country the type of arthritis variously referred to as "atrophic," "rheumatoid," "infectious" or "proliferative" arthritis is characterized by swollen, painful joints, muscular atrophy, vasomotor alterations affecting the extremities,

loss of weight, anemia, rapid erythrocytic sedimentation rate, articular destruction and decalcification of juxta-articular bones. Subdivisions of the large group of conditions known generally as "chronic atrophic arthritis" are frequently made in France and England. The idea that the conditions are caused by streptococcal infection has been gaining favor in this country. In Europe, however, this theory is not so highly regarded. Crowe (London), for one, was continuing his investigations on the theory of infection. As a result of making cultures from many foci on a special chocolate medium and on slants made from the patients' own blood, he was convinced that staphylococcal infections cause atrophic arthritis. Two others who expounded the infectious theory have demonstrated that the antihemolysin content of the serum of patients who have infectious (atrophic) arthritis is high, and that if patients have hypertrophic (senescent) arthritis the antihemolysin content of the serum is low. The investigators have considered this to be indirect evidence that infections with hemolytic streptococci are associated with atrophic arthritis. Many of those who expressed the belief that infection must play a rôle, did not, however, contend that a specific infection was necessary. It was their opinion that any one of several infections that produce atrophic arthritis in one case may cause fibrositis in a second, rheumatic fever in a third or may produce no symptoms at all. Their belief, they said, was that the individual reaction of the body may be of more importance than the infecting bacteria in determining the type of rheumatic disease which will develop.

Atrophic arthritis is generally subdivided into "rheumatoid" and "infective" arthritis in England and France. It is claimed that patients who have infective arthritis more frequently give histories of infection immediately preceding the onset of the arthritic condition, are less seriously affected, and respond more readily to removal of foci than do those who have rheu-

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matoid arthritis. The latter lose more weight and strength and present more vasomotor alteration than do those with infective arthritis. According to Scott (London) roentgenograms of both groups of patients may give evidence of destruction of joints. However, roentgenograms of patients who have rheumatoid arthritis reveal signs of decalcification of all bones, while those of patients who have infectious arthritis demonstrate decalcification only of the epiphyseal ends of the bones that make up the involved joints. Gordon and Burt (Bath) expressed the belief, as do many Americans, that, just as is true of infective arthritis, rheumatoid arthritis is an infectious disease that has attacked a patient whose resistance is lowered. They are of the opinion that the characteristic vasomotor alterations and loss of weight which may precede the onset of the arthritic symptoms of patients who have rheumatoid arthritis are the early manifestations of their lowered general resistance.

Treatment of Chronic Atrophic Arthritis

The importance of physiotherapy in the treatment of atrophic arthritis was stressed by nearly all of the European physicians whom I met. Robinson (London) used only diathermy. In the spas, warm baths in natural water were used. The physicians also claimed that benefits were obtained from the sulphur contained in the water or from its radio-activity. Others used sprays or mud baths. Massage and exercises usually followed each treatment. Clinics in conjunction with physiotherapy units were established in many of the leading cities to care for ambulatory patients. The hours of treatment were arranged so that patients could continue their work. Charges were minimal except when the patients were able to pay the full value of each treatment. I had an opportunity of observing the units in London, Amsterdam, and Glasgow and while there I was again impressed with the great value of physiotherapy, especially from the standpoint of protection against deformity.

Obvious foci of infection were removed conservatively. Improvement following removal of foci was reported to be much more common in cases diagnosed "infectious arthritis" than in those called "rheumatoid arthritis." Streptococcal

vaccines had been tried by twenty-one of the physicians I met. Nine of them occasionally used autogenous or pooled vaccine; the others had discontinued use of these preparations because of disappointing results. Crowe (London) reported good results from injections of his autogenous and pooled vaccines. There is considerable disagreement among English physicians about the merits of the Crowe vaccine. Typhoid vaccine was used by five of the physicians and bee venom by two. All seven felt that this nonspecific treatment was of distinct help in controlling atrophic arthritis. Injections of colloidal gold were widely used in France and Great Britain in treatment of the condition called "infectious arthritis" and of that called "rheumatoid arthritis." The opinions were that it helped control the condition in some of the cases in which conservative treatment failed. The initial injections were small, the increase gradual and the treatment was continued for about three months. The patients were kept under close supervision. Of eleven physicians who were using colloidal gold, nine were encouraged and two were disappointed with their results. I saw one patient who had very severe dermatitis and was told about four other cases in which one of the following conditions had developed: severe hepatitis, iritis, severe albuminuria, and hematuria complicated by uremia. One death from uremia also had been reported. Ray (London) well expressed the views of several others in saying that he used colloidal gold as a second or third line of attack in case more conservative treatment was not effective.

Scott (London) said that he applied six light doses of roentgen rays to the backs of patients who had atrophic arthritis. The resultant clinical improvement and the decrease in the sedimentation rate of erythrocytes had convinced him that such treatments nonspecifically increased the resistance of patients who had arthritis as well as of those who had several other diseases. According to Robinson (London) pelvic diathermy is the most effective way of treating atrophic arthritis. He considers the pelvis (prostate gland, uterine cervix or adnexa) as the most common foci of infection.

Hyperparathyroidism was diagnosed frequently by two of the physicians, in cases clinically indistinguishable from atrophic arthritis,

if progressive ankylosis of joints or scleroderma was present. Elevation of the concentration of serum calcium was not often present. Their treatment for these patients was parathyroid-ectomy. Two others were injecting parathyroid extract. It is difficult to understand how two such physiologically opposite treatments can give the encouraging results reported by these clinicians.

"Tuberculous rheumatism" is, according to some French and English physicians, a clinical entity different from tuberculous arthritis. The clinical concept of the latter is familiar to all; biopsy of affected joints presents the typical microscopic picture of tuberculosis, and if guinea-pigs are inoculated with fluid from the affected joints, tuberculosis develops. In tuberculous rheumatism, bacilli of tuberculosis are seldom or never found on microscopic study of affected joints and in examination of guinea-pigs inoculated with joint fluid the organisms seldom or never are recovered. The clinical pattern usually ascribed to tuberculosis rheumatism was that of polyarticular arthritis, either acute or chronic, a family history of tuberculosis, demonstrable tuberculosis elsewhere than in the joints, calcified lymph nodes, fibrosis of the lungs, a history of pleurisy, considerable synovial and capsular reaction around the affected joints, tenovaginitis, much associated loss of weight and weakness, positive Mantoux or von Pirquet tests with resultant transitory flare-up in the joints after the test, and increased opsonic index. Two of the physicians had sent blood of their patients to Löwenstein and had received reports that cultures for bacilli of tuberculosis were positive in 10 per cent of them. This work has been repeated in this country but Löwenstein's findings have not been confirmed. Treatment advocated for tuberculous rheumatism was essentially the same as that for atrophic arthritis except that for tuberculous rheumatism colloidal gold was used more frequently and small injections of tuberculin were given.

Of sixteen of the physicians who were interested in tuberculous rheumatism, four felt that such a diagnosis was not justified. Of the many cases that I saw, in only one was the result of inoculation of a guinea-pig reported to be positive. As far as most American physicians are

concerned, so-called tuberculous rheumatism is indistinguishable from chronic atrophic arthritis. Further investigations of tuberculous rheumatism will be of interest, but as yet convincing proof that such an entity exists is lacking.

The chronic progressive arthritis that occasionally follows gonorrheal infections was considered by seven of the physicians whom I met, to be attributable to the antecedent gonorrheal infection. They did not consider the finding of gonococci in smears to be necessary to diagnosis. Their treatment consisted of local application of heat in the form of diathermy, hot packs or hot baths, or general application of heat by radiotherapy or baths. Six physicians used gonococcal vaccine. None of these physicians were attempting culture of gonococci for diagnosis nor in treatment were they using hyperpyrexia sufficiently extreme to kill the gonococci. In America, cultures have been of considerable help in separating the patients who have chronic gonorrhea from those who have atrophic arthritis which has happened to develop after a gonorrheal infection. Fever therapy usually stops the active gonorrheal infections but if the condition is atrophic arthritis, the improvements are less apparent.

The diagnosis of syphilitic arthritis was used by six physicians to include almost all cases of progressive arthritis in which the Wassermann reaction was positive or in which there was a history of syphilis. They considered their diagnosis established if the patients responded favorably to arsenic, bismuth or potassium iodide.

Hypertrophic (Senescent, Osteo) Arthritis

There was no uniformity of opinion as to the cause of hypertrophic arthritis. Opinions regarding the cause of hypertrophic arthritis were given as: trauma, age, streptococcal infection, gout and thyroid or ovarian deficiency. Streptococcal infections were considered by Crowe as the cause of hypertrophic arthritis. He treated his patients with streptococcal vaccine. Robinson believed the condition attributable to ovarian and thyroid deficiency; in treatment of his patients he gave small doses of thyroid extract and in an attempt to stimulate the ovaries he used pelvic diathermy. The most widely used treatments were physiotherapy or spa treatment, weight reduction when indicated, and small doses of thy-

roid. Articular bone punctures were advocated by two physicians, one in Paris and one in Amsterdam. Postoperative improvement was assured by one physician. The other had followed ten or twelve of his patients and concluded that the condition of a few of the joints operated on had improved; the arthritis of several of the joints operated on had progressed. Local roentgen therapy for hypertrophic arthritis was reported by four physicians as giving improvement. The physicians who diagnosed some cases with Heberden's nodes and transitory bursitis of the shoulder as gout, restricted the intake of purine of many patients who had hypertrophic arthritis. This will be discussed more fully later.

Rheumatic Fever

Schlesinger and Signy* (London) have centrifuged the pericardial fluid of patients who had died of rheumatic fever. In the sediment, small bodies of uniform size were seen under dark-field illumination. They identified these bodies as organisms and said that they were a virus. They stated that specific agglutinins are present in high titer in the serum of patients who have rheumatic fever. Serum of patients who had atrophic arthritis and scarlet fever contained very little agglutinin except for one of the patients who had scarlet fever and who at the time was having pains in the joints. Further investigations with the "virus" had not been carried out when I was there.

The usual treatment advocated was prolonged periods of rest, and administration of calcium-aspirin. The calcium-aspirin was considered to be just as effective as salicylates and less upsetting to the stomach. The attitude toward removal of foci of infection was conservative; vaccine therapy was not widely accepted. Frazer and Walsh (London) were treating patients who had rheumatic fever, pneumonia, septicemia and erysipelas with intravenous injections of very finely suspended 5 per cent olive oil in water. Frazer reported that the temperatures of patients who had pneumonia, septicemia and erysipelas returned to normal a few hours after the injection of the olive oil. Subsequent roentgenograms of the lungs supposedly showed that the consolidated pulmonary tissue went through the

usual stages of resolution noted in cases in which treatment with olive oil had not been employed. Frazer reported that for patients with rheumatic fever, from four to six injections were necessary the first day and usually two daily injections for a week before the patient's temperature remained normal. He explained that the beneficial results from injections of olive oil in these cases are the apparent clinical improvement and relief from severe toxemia. In Frazer's opinion the probable mechanism of detoxification is the adsorption of the toxins on the surface of the very small globules of olive oil.

Fibrositis

Fibrositis is one of the most common of the rheumatic diseases seen in England and Scotland. It is seen in the transitory acute stages as well as in the chronic fibrositis and panniculitis, both of which may be present for years. In the opinion of several physicians of the countries named, the contractions of fibrous tissue only occasionally were of concern, and deformities of joints only rarely occurred unless there was an associated hypertrophic arthritis. Infection was believed to be the cause of most of the cases of fibrositis. Stockman (Glasgow) frequently obtained the history that an attack of influenza, a sore throat or some other infectious condition preceded or was coincident with the onset of the fibrositis. Acute trauma or recurrent slight trauma was considered of etiologic importance in some cases, and was believed to be important as a contributing etiologic factor in many other cases. Sluggish circulation of blood and lymph, resulting in stagnation of unknown waste products, was commonly thought to explain the stiffness and aching of which the patients who had fibrositis complained. The opinions that deficient circulation as well as dysfunction of the thyroid or ovaries are of importance were based on impressions rather than on investigation.

Subcutaneous nodules were frequently felt by six of eleven physicians who looked for them. The microscopic appearance of the nodules was similar whether they were associated with traumatic fibrositis, infectious fibrositis, or whether they were found in examination of patients who had infectious arthritis. During the subacute phase, the principal cellular reaction was mononuclear. During the chronic stage, the nod-

*Schlesinger, Bernard, Signy, A. G., Amies, C. R., and Barnard, J. E.: *Ætiology of acute rheumatism: experimental evidence of virus as the causal agent.* *Lancet*, 1:1145-1149, (May 18) 1935.

ules were made up mostly of a proliferation of fibrous tissue. When the reaction was mainly subcutaneous (panniculitis) the groups of fat cells were separated by large bands of fibrous tissue.

The treatment was mainly heat and massage, to hasten the absorption of the tender nodules and increase local circulation. Stockman (Glasgow) surgically removed some of the tender nodules to relieve pain. Removal of foci was conservatively applied in the cases of acute and subacute fibrositis. Vaccines were not used. Five physicians were using histamine by injection or ionization; only two were encouraged by their results. Robinson (London) expressed the belief that pelvic diathermy gave his patients the most relief. The patients who had panniculitis and were overweight were given a weight-reduction diet and thyroid.

Gout

Gout was of particular interest to fifteen of the physicians with whom I talked. Five used much the same criteria for making the diagnosis as we use at The Mayo Clinic. They considered the only proof of the presence of gout to be the demonstration of a tophus containing crystals of sodium urate. However, undoubted gout was recognized in most cases early in the course of the disease because the patients gave histories of recurrent episodes of severe pain, redness and swelling of a joint, the condition of which returned to normal in from three to fourteen days without any apparent residual damage. Gout was considered to be much more common among men than women. The first metatarsophalangeal joint was considered to be most frequently affected. Ten physicians also diagnosed gout in a group of patients whose complaints were of painful Heberden's nodes and transitory bursitis of the shoulder; in this country, cases of this sort are considered to be examples of senescent (hypertrophic) arthritis. In order to include this condition in the category of gout, the ten physicians mentioned emphasized certain points in which the two are similar: Both

are more frequent in middle age than at other times of life. In both, a family history of a similar type of arthritis affecting relatives occasionally can be obtained. In both, concentration of uric acid in the blood occasionally reaches a level considered to be high normal. Roentgenologic evidence of punched-out areas in bones near affected joints may be found in both. Most patients who have Heberden's nodes and bursitis, however, do not give histories of repeated acute attacks of arthritis; their condition is not made worse by a provocative test consisting of a diet high in purine, nor do tophi develop. (I am not as yet willing to include such cases under the diagnosis of gout.)

The treatment for acute attacks of gout usually consisted of a diet low in purine and administration of colchicum. Between attacks the physician usually advised moderate restriction of the intake of purines. Pisini (Florence) was unfamiliar with the work done recently by Locke in this country on the high carbohydrate diet for gout; nevertheless he prescribed a high intake of sugar for his patients who had gout. If they could not take sugar by mouth he gave it intravenously or by rectum. On such a regimen he noticed definite improvement. Certain foods to which a patient who had gout was sensitive were considered of great importance in the precipitation of an attack of gouty arthritis. Foods to which the patients were sensitive were determined by obtaining a careful history. Joltrain (Paris) injected intradermally aqueous solutions of common foods, in studying his patients who had gout. He eliminated from their diet the foods to which they showed cutaneous hypersensitivity, regardless of the purine content of the foods. Of ten physicians with whom I discussed cinchophen in the treatment of articular gout, only four used it during the acute attack and only one in the interval between attacks. Although they recognized its therapeutic value and had not themselves seen a case of atrophy of the liver from its use, most of them were afraid to use it because of what they had read regarding its toxic effects.

LYMPHOGRANULOMA INGUINALE*

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LYMPHOGRANULOMA inguinale is a disease which often is venereal in origin, has a variable incubation period, a primary sore, involvement of the lymph glands draining the primary sore, a more or less specific diagnostic test, and often has complications following or accompanying the local lymph gland involvement. Many observers have rightfully objected to calling the infection lymphogranuloma inguinale, but common usage seems to indicate that this name will persist. The disease need not be venereal in origin and any group of lymph glands may be involved.

Lymphogranuloma inguinale has occupied a major position in the recent dermatological literature of the world. In this country most of the cases were reported from the southern states or northern cities with a large negro population. As far as I know, the first six examples of lymphogranuloma inguinale to be reported from Saint Paul were seen at the Ancker Hospital during the past year. This fact alone is a good reason for bringing lymphogranuloma inguinale to the attention of the general medical public of Minnesota. In this article no attempt will be made to review the voluminous literature on lymphogranuloma inguinale, and it is suggested that those readers who desire more extensive and detailed information peruse the writings of Cole,¹ Sulzberger,⁸ Durand Nicholas and Favre,² Hellerström⁴ and others.

When the disease is venereal, the incubation period of five days (Case 4) to three weeks post-coitus, is followed by a primary lesion which may pass unnoticed by the patient. The primary sore may appear as a transient herpetic vesicle (Case 2), an ulcer or erosion (Cases 1, 4, and 5), a urethritis (Case 3), or a nodular lesion resembling a syphilitic chancre. The only woman in this group did not notice a primary lesion.

Symptoms of fever, malaise, headache, and muscle pains did not appear until the lymph nodes began to enlarge. The fever varied from

100 to 102 F. and continued until free drainage had been established. All of the patients complained of pain on walking. The males, all of whom were laborers, found it necessary to quit work because they could not do manual labor.

The lymph gland enlargement is in progress when the primary lesion is still present. Some of the patients noticed or felt the gland enlargement before the primary sore was seen. The period from noticeable, painful adenitis to suppuration is usually two to four weeks. The glands draining the primary lesion, enlarge, become hard, matted, and painful. Later the skin becomes reddish purple and shiny as the lymph nodes break down and suppurate. The glands in the inguinal region may reach the size of a fist or larger before the skin is ruptured and a sinus is formed. Cole stated that the glands form multiple fistulous openings differing from the suppurating chancroidal bubo which forms a large single opening. Other nodes become involved and go through the same cycle. Cole said that the local lymph node reaction may be associated with a generalized lymph node enlargement, an enlarged spleen, and polyarthritides. Hellerström noted accompanying erythema nodosum and erythema multiforme-like eruptions, urticaria and scarlatiniform eruptions.

Lymphogranuloma inguinale in the female generally assumes different characteristics because of the lymph drainage of the female genitalia. The lymph from the clitoris and external vulva drains into the inguinal lymph nodes, while the lymph from the vaginal mucosa drains into the lymph nodes around the rectum. The female with lymphogranuloma inguinale may show elephantiasis of the vulva, ulceration of the rectum, perineal body, anal orifice, and labia, or multiple rectal fistulas which may be followed by scarring of all the parts and stricture of the rectum and anus. Some think that the infection can be harbored in the female as a saprophyte. S  n  que⁶ summed up the types of inflammatory stricture of the rectum seen in lymphogranuloma inguinale in the following four forms: a pure stricture limited to the rectum, a rectal stricture

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with elephantiasis of the external parts, a rectal stricture complicated by fistulas, and rectal stricture with pelvic cellulitis.



Fig. 1. Case 1. Initial lesion of lymphogranuloma inguinale appearing as a superficial, ulcerating papule on the prepuce.

Frei Test.—The diagnosis of lymphogranuloma inguinale depends to a great extent on the Frei³ test. Pus is removed from a suppurating lymph node which has not ruptured in a patient who has lymphogranuloma inguinale, but who has never had a chancroidal infection. The pus is diluted, sterilized, and tested on known cases of lymphogranuloma inguinale. An intradermal injection of .1 c.c. of material is used and a red papule at least .5 cm. in diameter appears if the test is positive. The test is often negative in the first three weeks of the disease, but when positive it probably remains so throughout life. The Frei test is not specific for lymphogranuloma inguinale and some observers⁷ think that it gives non-specific reactions in as high as ten per cent of cases.

Case Reports

Case 1.—A. M., a white laborer, aged twenty-eight, stated that he noticed a small pinhead-sized superficial erosion on the prepuce about the last week in October, 1934. This lesion was painless, exuded a slight amount of serum and healed in about ten days. The penile lesion was followed in about four or five days by lymphadenitis on the right side. The glands were painful, matted together, and increased in size until a

mass about the size of an egg was formed. In two weeks the mass became fluctuant. It was incised, a small amount of pus drained, and the wound was packed with iodoform gauze. Frei tests were strongly positive three weeks after the onset and tests on controls were negative. Frei antigen was used therapeutically until January 1, 1935, but no improvement was noted. The patient was hospitalized, warm, wet packs were applied, and the granuloma seemed to have healed by January 20, 1935. When he returned to the Ancker Hospital, on March 15, 1935, the lymphogranulomatous mass was larger and more painful than on any previous occasion. On this admission small doses of filtered x-rays were given at weekly intervals in addition to wet packs, drainage, and rest in bed. Each treatment of x-rays given to all of the patients consisted of approximately 160 roentgen units with 4 millimeters of aluminum filter. Six treatments were given and the patient discharged as cured on May 20, 1935. There had been no recurrence up to March 15, 1936.

The past history gave no important information. The patient denied having sexual relations with anyone except his wife, who, after repeated exposures even when the primary lesion was present, did not contract the disease.

Darkfield examinations of the serum from the primary lesion for *spirocheta pallida* were repeatedly negative. Ducrey bacilli were never found in the pus. Blood Wassermann reactions were repeatedly negative.

Case 2.—R. P., a negro laborer, aged forty, noticed a penile lesion described as a small water blister appear on the dorsum of the prepuce about November 1, 1934. This lesion was accompanied by painful left inguinal lymphadenitis. The lymph glands increased steadily in size and in February, 1935, a matted, painful group of glands about the size of a large egg were present. The central portion of the mass was fluctuant. The glands were incised, pus drained freely, and the wound packed with iodoform gauze. The Frei test was strongly positive on many occasions and negative in controls. The patient was given Frei antigen therapeutically for six weeks and the disease continued to progress. From February 15, 1935, to March 20, 1935, neosalvarsan and tartar emetic were used without success. The patient was hospitalized, wet packs applied, and small doses of filtered x-rays were given at weekly intervals for seven weeks. The granuloma had healed by May 20, 1935, and when the patient was examined on March 15, 1936, there were no signs of recurrence.

The past history disclosed that he had been treated for syphilis at the Mayo Clinic during 1920. He had a urethral discharge in 1930 which he treated himself. The patient admitted frequent relations with both colored and white prostitutes.

Pus from the lymph glands showed no evidence of Ducrey bacilli. Blood Wassermann reactions were repeatedly negative.

Case 3.—M. C., a negro laborer, aged forty-five, noticed a bilateral painful inguinal adenitis about January

1, 1936. The nodes became matted and grew progressively larger and more painful. The patient had sexual intercourse with a colored prostitute in the latter part of November, 1935. There was no penile lesion noted, but he had a milk colored, watery urethral discharge for a week before the adenitis appeared. The nodes in both inguinal regions were the size of a fist and contained a large amount of pus. The patient complained of constipation and extreme pain on defecation, but proctoscopic examination was negative. Ducrey bacilli were not found in the pus. Frei tests were repeatedly positive. Blood Wassermann examinations were repeatedly negative. Gonococci were not found. The patient was hospitalized on January 28, 1936, wet packs were applied, and drainage was established. After receiving four x-ray treatments, the patient left the hospital on February 28, 1936, with the wounds healed and the granulomatous masses no longer in evidence.

Case 4.—E. J., aged thirty-five, a white laborer, was first seen on January 10, 1936, with a superficial ulcer at the urethral meatus which was indurated and exuded serum. The ulcer appeared five days after intercourse with a white prostitute. A bilateral, olive to small hen's egg sized, tender inguinal adenitis was present. The patient stated that the adenitis appeared a day or two before he noticed the penile ulcer. There was a slight milky, urethral discharge seen when the erosion appeared, and this discharge continued for six weeks. The ulcer and adenitis remained about the same for a period of four to five weeks. About the beginning of the fifth week, the penile ulcer began to enlarge and a massive edema of the prepuce appeared. The first Frei test done on January 20, 1936, was negative. The remaining Frei tests, done after January 28, showed an increasingly positive reaction. No Ducrey bacilli were found and smears were negative for gonococci. Darkfield examinations for spirocheta pallida were repeatedly negative. The blood showed a positive Wassermann reaction on February 7, 1936 (about the seventh week after the onset of the adenitis), and a macular secondary syphilide appeared on the skin at that time. The patient has received treatment for syphilis since February 7, 1936, but no x-ray therapy to the glands. On March 30, 1936, the penile erosion was healed and the inguinal lymph glands were pea to bean sized and firm. The Frei test still was strongly positive.

Case 5.—J. R., a white laborer, aged thirty, was first seen on October 1, 1935, with a painful, fluctuant, left inguinal bubo and a small, pea-sized, painless ulcer of a week and a half duration on the mid-dorsal portion of the prepuce. There was a bean-sized, firm nodule to the left of the midline, midway on the dorsum of the shaft of the penis. He stated that he had noticed a urethral discharge about one month previously which was followed in a few days by the left inguinal adenitis. He denied having had sexual relations with anyone except his wife. Darkfield examinations of the

ulcer were repeatedly negative for spirochetes. No gonococci or Ducrey bacilli were found on repeated examinations. The first Frei test on November 26 was



Fig. 2. Case 6. Lymphogranuloma inguinale in the female showing massive edema of the vulva and accompanying lymphadenitis.

positive and since then there has been a more marked reaction with each test. Blood Wassermann tests were repeatedly negative. The bubo was incised but the disease continued to progress until he was admitted to the hospital on December 17, 1935. He received six x-ray treatments at weekly intervals and was discharged from the hospital on January 28, 1936, when the granuloma had healed. There was no recurrence when the patient was last seen on March 17, 1936.

Case 6.—A white woman, aged twenty-five, and the wife of J. R., Case 5, first complained of a painful induration and edema of both labia majora and left inguinal adenitis, on November 20, 1935. She was first seen at the hospital on December 6, 1935, when the adenitis was incised and drained. There was no history or evidence of a primary lesion. The patient had had sexual intercourse with her husband shortly before the edema and adenitis was noted. The husband had a penile ulcer and inguinal adenitis at that time. The blood Wassermann reaction was repeatedly negative. Smears were negative for gonococci and Ducrey bacilli on many occasions. The Frei test was moderately positive on December 8, 1935, and strongly positive since January 1, 1936. The patient was given six x-ray treatments using the previously mentioned dosage. She also was kept in bed, wet packs were applied, and free drainage was established. The granuloma was healed on March 10, 1936.

Hellerström and Wassin⁵ proved the disease to be caused by a filtrable virus. The pathology is that of a non-specific chronic infectious granuloma closely resembling tuberculosis and syphilis.

The diagnosis was comparatively simple in all of these cases with the exception of Case 4. Here the two possibilities are evident: first, the



Fig. 3. Positive Frei test reaction seventy-two hours after injection.

patient was infected with lymphogranuloma and syphilis at the same time and the syphilitic chancre developed at the site of the primary lesion of lymphogranuloma inguinale; or, second, the patient had syphilis with a positive Frei test. The sequence of events and the persistently positive Frei test, after extensive treatment for syphilis would be more in favor of the first view.

Lymphogranuloma inguinale should always be thought of when a patient has a suppurative inguinal adenitis, rectal or anal stricture, a history of a transitory primary lesion, and a positive Frei test. Granuloma inguinale is a disease of the skin, not of the lymph nodes, and the only confusing point is in the similarity of the names. The nodes in syphilis are hard, shotty, and do not suppurate; also there would be other evidences of syphilis and probably a positive

blood Wassermann reaction. Chancroidal infections are more acute, Ducrey bacilli can be found, autoinoculation is positive, and there is a positive Ito-Rienstierna reaction and a negative Frei test. Hodgkin's disease, tuberculosis, bubonic plague, tularemia, malignant growths, and pyogenic infections must be ruled out.

Many types of treatments have been recommended for lymphogranuloma inguinale. All of my cases, treated in the following manner, responded favorably: rest in bed, establishment of drainage, warm wet packs, and 160 roentgen units of x-rays with 4 millimeters of aluminum filter given at weekly intervals for six weeks.

Summary

Six cases of lymphogranuloma inguinale are reported with the details of the clinical course and therapy. This condition is an infectious disease most commonly involving the pudenda. All patients with a persistent suppurating lymphadenitis, rectal stricture, or unexplained chronic inflammatory changes in the pelvis should be subjected to the Frei test with lymphogranuloma inguinale in mind.

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DEATH FROM ASTHMA*

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OLIVER WENDELL HOLMES, as quoted by Osler, considered asthma "the slight ailment that promotes longevity."

Before this Society, in 1930, Dr. C. B. Wright⁸ reviewed the literature and reported a case of fatal asthma, which but served to emphasize the rarity of death from this disease without complications. Hüber and Koessler³ reviewed the subject in 1922 and gave a summary of the pathology of the condition, based on twenty-one cases. The count has been increased in the last decade and Dr. Rudolph Koucky,⁵ in a personal communication, states that he has found fifty-two cases in the literature and thirty-five cases in the autopsy records of the University of Minnesota from 1914 to 1934. Of these nine have insufficient material preserved upon which to base a diagnosis. Ten are undoubtedly bronchial asthma without complications, while sixteen of the twenty-six, with adequate material for study, died of complicating conditions. This study will be published in detail at an early date. His material has proved helpful in furnishing a basis for differentiation between bronchial asthma per se, an allergic condition, and symptomatic asthma and will be referred to again.

Michael and Rowe,⁷ in 1934, in reporting two cases of bronchial asthma, were able to collect twenty-nine complete autopsy reports and reviewed the pathological studies. They believe that death during attacks of asthma is not especially infrequent and cite forty-nine cases, including the above twenty-nine with complete reports and twenty more without microscopic studies, and say that most allergists have attended patients who have died during attacks, as attested by personal communications.

The clinical diagnosis of bronchial asthma is not always corroborated by the pathologic studies. The recent interest in allergy as a cause of disease has clarified our knowledge somewhat. Spasmodic dyspnea, relieved by adrenalin and associated with eosinophilia and other signs of

allergy, occurring without underlying cardiac or pulmonary abnormality, would seem to characterize the disease picture of bronchial asthma. From the standpoint of the pathologist the lung must show macroscopically:¹ (1) emphysema; (2) increased thickness of the walls of the bronchi with a narrowing of their lumina; (3) increased thickness and infolding of the mucous membrane; (4) excessive mucus or the presence of plugs of tenacious mucus and fibrin in most bronchi; (5) dilatation of smaller bronchioles and alveoli. Microscopically there are: (1) increased thickness and infolding of the mucous membranes of bronchi larger than 2 to 3 mm.; (2) infiltration of the mucosa, submucosa, mucous glands and muscles and at times the cartilage with eosinophiles, plasma cells and lymphocytes; (4) hypertrophy of the muscles. Michael and Rowe also found a myositis of the bronchial muscles.

The case herewith presented conforms to both clinical and pathological standards and merits inclusion with previously reported cases. When Dr. Koucky's paper is published, there will be a further augmentation of completely studied cases from the University collection and further clarification of standards.

Case Report

An unmarried woman of fifty-six, with a history of asthma on her father's side, had hay fever in her youth, asthma for over twenty years and frequent attacks of tonsillitis all her life. Her doctor had advised her against serums. Her asthma had become worse following a cold six months before and especially since a recent cold, and proprietary medicines (asthmalene—a powder for smoking) had come to be unavailing. She was unable to sleep and could breathe only when propped up on pillows.

Examination was as follows: Height, 5 feet 4 inches; weight 93 pounds. Skin of body dry. Dermatitis about nostrils. Upper dental plates. Emphysematous chest. Blood pressure, 130 systolic and 80 diastolic. Chest plates showed normal diaphragms and lung fields, a narrow heart and somewhat lengthened aorta. The costal cartilages were calcified. Cloudiness of both antra appeared in sinus plates. The nasal mucosa was markedly infected and polypi were present on both sides. The tonsils were hypertrophied, with reddened

*Read before the meeting of the Minnesota Society of Internal Medicine, St. Paul, Minnesota, November 11, 1935.

pillars and debris in the crypts. Urinalysis was normal. The blood count showed hemoglobin, 66 per cent; red blood cells, 4,510,000; white blood cells, 12,150, with 33 per cent eosinophiles. The sputum showed many eosinophiles. Skin tests (scratch method) were $\pm$ to twenty-six test materials, including animal material and pollens.

Nasal polyps were removed and later tonsils, and the patient was placed on sedative medication and given a course of autogenous vaccine made from her own sputum. She returned to her home, much improved in her breathing, able to lie down at night, with only one or two mild attacks to disturb her.

Five months later, on October 13, 1933, she reported that her attacks had returned to their former severity as soon as she had reached her home, and three severe attacks had lasted one to seven days each, during which death was considered impending. Her weight was 88 pounds. From this time until her death, on December 11, 1933, she was given adrenalin daily with gradually increasing frequency, a period of ketogenic diet and a course of hay fever antigen. The last two days adrenalin failed to give even temporary relief, as did glucose intravenously, according to the method reported by Dr. Lepak before this society in 1933. Frequently injected morphine gave her periods of relative rest. There was no temperature elevation, no edema of the lungs or extremities. During the last few hours the respiration became more shallow and slow with intervals of apnea of 45 to 60 seconds, and the heart rate varied from 88 to 100.

Autopsy was performed by Dr. George K. Higgins with the following findings: "Pleural cavities and pericardial sac are normal. The heart weighs 225 grams with no evidence of hypertrophy, dilatation, fibrosis or valvular abnormality. The myocardium is slightly darker than is usual and of firm consistency. The root of the aorta shows slight atherosclerosis and the coronary arteries are slightly thickened but not narrowed or occluded. Each lung weighs 300 grams with normal appearance of vessels and bronchi. There is a moderate emphysema with pale pink parenchyma free from pus, fluid or blood. The bronchioles are prominent and filled with thick, tenacious mucous plugs."

Microscopic appearance was described as follows: "The alveolar walls in some areas are stretched and thinned while in other locations they appear normal. The small bronchi are occluded by plugs composed of mucus but containing many cells, chiefly eosinophiles and lymphocytes but also occasional neutrophils. No definite thickening of the muscular layers of the smaller bronchi is evident but they show an extensive infiltration by lymphocytes and eosinophiles."

What is likely to be the final outcome in a case of severe clinical asthma? In an attempt to formulate an answer, I have gone over the autopsy records of the fifteen cases with bronchial asthma considered by clinical standards to

be the primary or contributory cause of death in the University of Minnesota collection of 1933 and 1934. These will all be included in Doctor Koucky's detailed and critical studies and most of them eliminated because of other anatomical conditions with asthma only a symptom. The diagnosis of bronchial asthma has been made, however, in all of them by reliable clinicians, and their errors as shown by subsequent autopsy studies may serve to clarify the diagnostic difference between bronchial (primary) and symptomatic asthma. Four patients, dying of bronchial asthma, according to pathological criteria, are found in this two-year group of fifteen autopsies, including the one reported above. There were two males and two females, forty-five, forty-seven, fifty and fifty-four years of age. The duration of asthmatic symptoms was sixteen years in two cases, one year in one and over twenty in the fourth. One death followed a few minutes after a bronchoscopic examination with the injection of lipiodol; one died in the car on the way to the hospital. There was no clinical evidence of circulatory disease and three hearts were found to be normal, while one weighed 300 grams with slight hypertrophy and relative dilatation of the right ventricle.

What of the eleven cases with clinical bronchial asthma but pathologic complications? They are of special importance to the internist for he must attempt to determine whether organic disease causes the symptom known as asthma or whether, in the course of his observation, organic disease supervenes in allergic asthma. Of these eleven, ten were males and their ages ranged from thirty-two to eighty years. The duration of asthmatic symptoms varied from three weeks in a man of eighty, to fifty-three years in a man of seventy-eight. Pulmonary infection was considered the cause of death in seven, bronchopneumonia in three, pneumococcal pneumonia in one, bronchiectasis in one, tuberculosis in one, and "purulent bronchitis" in one. A fractured pelvis and peritonitis from a perforated gallbladder accounted for two deaths; one died of emphysema; and one had a polycythemia and died of chronic congestive heart failure. Marked fibrous adhesions were present in six cases and emphysema in four.

What of the heart in bronchial asthma? Three

TABLE I. REVIEW OF FIFTEEN CASES OF BRONCHIAL ASTHMA
(UNIVERSITY OF MINNESOTA RECORDS, 1933-1934)

		Time	Heart Symptoms	Cause of Death	Emphysema	Pleural Adhesions	Heart Weight	Ventricles	Congestive Failure	
1	F-47	16 yrs.	—	Bronch. asth.	+	—	300 gm.	R slight	—	Typical asthma
2	F-54	20 yrs.	—	Bronch. asth.	+	—	225 gm.	—	—	Stat. lymph.
3	M-50	1 yr.	—	Bronch. asth.	+	—	275 gm.	—	—	1 day in hosp.
4	M-45	16 yrs.	—	Bronch. asth.	+	—	Normal	—	—	Sudden death
5	M-32	3+ yrs.	+	Bronch. pneum.	+	—	555 gm.	R & L	+	
6	F-36	2 yrs.	—	Tuberculosis	—	—	?	—	—	
7	M-35	3 yrs.	+	Pneumococcus pneumonia	—	—	625 gm.	R	+	
8	M-80	3 wks.	+	Purulent bronchitis	—	+	390 gm.	—	—	
9	M-68	Many years	+	Bronch. pneum.	+	+	618 gm.	R & L	+	
10	M-53	All his life	+	Bronchiectasis	+	+	375 gm.	R	—	
11	M-55	30 yrs.	+	Fract. pelvis	—	+	800 gm.	R & L	+	
12	M-78	53 yrs.	—	Bronch. pneum.	—	+	280 gm.	—	—	Ca. of stomach
13	M-58	Most of life	—	Perforated gallbladder	—	+	317 gm.	R	+	
14	M-50	7 yrs.	—	Emphysema	+	—	345 gm.	—	—	18 yrs. in steel grinding
15	M-43	5 yrs.	+	Right heart failure	—	—	496 gm.	R & L	+	Polycythemia
			7		4	6		7	6	

normal and one with slight right heart hypertrophy and dilatation were found in the four bronchial asthma deaths. Alexander, Luten and Kountz¹ found the heart singularly free from injury in fifty patients with asthma of five or more years' duration (nine of them with autopsy corroboration) and suggested that the increased intrathoracic pressure which occurs during the asthmatic paroxysm may impede the return of the venous blood and thereby actually diminish the work of the heart. Morris Kahn⁴ found electrocardiographic evidence of right ventricular preponderance in 20 per cent of fifty cases of bronchial asthma. Doctor Koucky believes that asthma by itself has no deleterious effect on the heart and that the hearts tend to be small. Fibrosis of the parenchyma of the lung due to ob-

struction of the bronchi in asthma may lead to secondary right-sided cardiac hypertrophy, he believes. Kountz and Alexander⁶ report three cases of clear-cut asthma, one of which showed a dilated and hypertrophied heart weighing 400 grams and with increased fibrous tissue. There was marked emphysema but no adhesions. The heart in Bubert and Warner's case² weighed 400 grams with hypertrophy of the right ventricle and slight increase of size of the individual fibres and of the interstitial fibrous tissue.

In comparison with the relative freedom from heart damage in primary asthma the eleven cases of symptomatic asthma include seven cases with cardiac hypertrophy, dilatation or both, and none with coronary narrowing or valvular disease. Seven of them showed ante-mortem evidence of

cardiac abnormality but not quite in correlation with the autopsy findings. The eighty-year-old patient (Case 8) had auricular fibrillation with no evidence of congestive failure clinically nor at autopsy and died of a purulent bronchitis. Blood pressure readings were recorded in seven of the eleven cases and all were normal or below. Hypertrophy and dilatation of the right heart, weight 625 grams, with acute passive congestion of lungs, spleen, liver and kidneys occurred in the patient dying of pneumococcic pneumonia (Case 7). Hypertrophy of the right heart with dilatation of all chambers, weight 618 grams, associated with chronic passive congestion of the liver and spleen but without edema, was found in a death from bronchopneumonia (Case 9). A slight hypertrophy of the right ventricle with a heart weight of 375 grams occurred in a patient with edema of the legs but no evidence of passive congestion of the organs (Case 10). The patient who died of a fractured pelvis and lung infarction (Case 11) had suffered with an enlarged liver for many years and edema of the feet for two years. His heart weighed 800 grams and showed hypertrophy of both ventricles, most marked of the right, and congestion of lungs, liver, spleen and fluid in pleural and peritoneal cavities. The one who died of peritonitis from a perforated gallbladder (Case 13) had a heart weighing 317 grams, with slight dilatation of right auricle and ventricle, congestion of lungs, liver and spleen. The patient with the polycythemia (Case 15) had edema of the legs, electrocardiographic evidence of right ventricular preponderance and at autopsy hypertrophy of both ventricles with dilatation of the right, and congestion of lungs, liver, spleen and kidneys. Another with hypertrophy of both ventricles, weighing 555 grams, showed edema of the ankles and died of bronchopneumonia. Six cases showed post-mortem evidence of congestive failure at autopsy, and seven right ventricular abnormality associated with left ventricular hypertrophy four times.

Summary

1. A case of fatal bronchial asthma, conforming to clinical and pathologic standards, is presented.
2. Four autopsied cases, including the above, abstracted from the records of the Depart-

ment of Pathology of the University of Minnesota (1933-1934), with a clinical diagnosis of bronchial asthma show no pulmonary disease except those typical for allergic asthma. In three the heart was normal and in one there was a slight hypertrophy and dilatation of the right heart, but no evidence of failure.

Eleven autopsy records of patients with clinical bronchial asthma listed as primary or contributory cause of death (1933-1934) are reviewed. None of these showed pathologic evidences of asthma. Seven patients died of pulmonary infections, acute or chronic, including tuberculosis in one. Two died of non-pulmonary accidents (fractured pelvis and perforation of gall-bladder); one of right heart failure with no evidence of primary pulmonary disease; and one of emphysema. Extensive fibrous adhesions occurred in six; emphysema in four; hypertrophied or dilated right heart in seven, associated with left heart hypertrophy in four; clinical evidence of congestive heart failure in seven; and pathologic evidence of congestive failure in six.

Comments

It is of interest to note that heart failure due to valvular, coronary or hypertensive disease was in no case confused with bronchial asthma. The frequency of fibrous pleural adhesions (six cases) in this group of complicated cases and the absence of such in the bronchial asthma group suggest an entirely different mechanism of origin, that is an infection leading to fibrosis of the lung with a chronic overloading of the right heart, causing ultimately a right heart failure with passive congestion favoring the development of pneumonia as a terminal event. The two patients dying from non-pulmonary causes (fractured pelvis and perforated gallbladder) both had extensive pleural adhesions and congestive heart failure and were suitable candidates for terminal pneumonia. The possibility of true asthma leading to obstruction of the bronchi, collapse, fibrosis of the parenchyma and secondary right heart hypertrophy must be considered, and Doctor Koucky has four of these in his group. It is possible that Case 15, with polycythemia and no lung adhesions, was in a late stage of such a picture, and that Case 1 of the true asthmatics was in an early stage of this process.

The probable cause of death in a case of severe asthma then depends on whether or not the underlying mechanism is allergic or inflammatory. Whether or not the asthma due to sensitization and related to anaphylactic shock in its mechanism, with typical changes in the bronchial musculature and secretions, can, through a superimposed bacterial infection, lose its typical characteristics and end in a chronic bronchitis or pleuritis with the end-results as outlined in our last group of cases, is a question not yet settled by the allergists. For purposes of clinical differentiation our cases of chronic asthma fall into a group with normal or unusually small hearts, with eosinophilia and without evidences of old or recent pulmonary infection or congestive failure. These seem to be the ones who die of asphyxia due to occlusion of the bronchial passages with mucus, free from bacterial infection. Patients in the other and larger group who suffer from severe asthma are likely to show evidences of chronic bronchitis

or pleurisy and of cardiac enlargement with ultimate failure, and die of some form of acute or chronic pulmonary infection. Studies of nasal mucosa for evidences of sensitization, of skin tests, or blood sedimentation and eosinophile counts carried out by the numerous workers in the problems of allergy, when correlated with careful autopsy studies, will serve to clarify the diagnosis of bronchial asthma so that early and accurate differentiation can be made by the clinician between primary and symptomatic asthma.

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VISUAL FIELD CONTRACTIONS AFTER HEAD INJURY*

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IN STUDYING the symptoms of head injuries, the distinction between the neurologic and psychiatric factors is extremely difficult. Through careful analysis much has been done to correlate certain symptoms often designated as psychogenic with the picture of true brain injury. As early as 1890, Guth⁴ gave visual field changes as an objective sign.

Even at the present time much controversy exists as to whether the contraction of the visual field is an hysterical or an organic symptom. McCullough¹⁰ reports in detail ten cases of contracted visual fields. Thirty other cases of hemianopsia were conceded by him to be due to cerebral injury. The causes of pathologic visual field changes after head injury, according to him, are: (1) traumatic cerebral edema; (2) retinal edema; (3) contusion or laceration of brain tissue; (4) intracranial hemorrhage; (5) sequelæ of injury, cysts, abscess, and arterio-

venous aneurysm. He believed, however, that some degree of visual field impairment is present in every case of head injury.

Another field defect demanding consideration is the ring scotoma. In a review by Langdon,⁶ retinitis pigmentosa, chorio-retinitis, optic nerve lesions, glaucoma, lightning flash, night blindness, migraine, and eclipse retinitis were ascribed as causes of this phenomenon. de Schweinitz² and others cite hysteria, while Nicolletti, Lodons, Leblond and Beauveix¹³ have reported this finding in head injury. Gelb and Goldstein³ report six cases of ring scotoma after head injury but think the condition is due to ocular fatigue rather than to hysteria. Definite cause as to its production in some cases at least was shown by Lillie and Adson.⁸ In their two cases, one of which was confirmed at operation, an annular and central scotoma was produced by the pressure of a callus from fracture through the optic canal. There was unilateral loss of vision in each case.

*Inaugural Thesis read before the Minnesota Academy of Medicine at the regular meeting of December 11, 1935.

Strauss and Savitsky¹⁴ think more attention should be paid to fatigue as a cause of annular scotoma, as fatigue and exhaustion are prominent symptoms of a post-concussion state. It is true that standardization of technic in mapping visual fields, plus the correlation of ocular and neurologic signs is necessary in order to properly evaluate the symptoms.

Concentric contractions, with which we are chiefly concerned, cause most of the controversy. As stated by two accurate observers, one in the United States and one in Germany, tubular fields are usually hysterical; however, inasmuch as contraction of the visual field with reversal of the color field has been observed in poisoning from coffee, nitrobenzene, optochin, quinine, alcohol, tobacco and lead, the conclusion cannot always be drawn that such findings prove hysteria. In one case of McCullough's,¹⁰ although details are meagre, constricted fields were found after head injury. In the hospital a diagnosis of toxic encephalitis was made and compensation denied. In another reported by Strauss and Savitsky¹⁴ a relative central scotoma in one eye, and an absolute in the other, plus marked contraction settled the pathologic nature of the lesion.

No definite pathologic change in the optic nerve has been observed to explain the cause of contraction of the visual field. Some of the causes proposed are: (1) hysteria; (2) increased diastolic pressure in the retinal veins; (3) edema of the optic nerve; (4) brain injury; (5) commotio retinae producing a physiologic block of the light impulse.

The evidence for the diagnosis of hysteria is that the visual fields correspond closely with those found in hysterical patients. Sometimes the vision is tubular, or so nearly so that it is difficult to differentiate. Central vision is involved when there is actual injury to the papillomacula bundle. The findings in any case do not constitute a sharp line of demarcation between the psychogenic and neurologic.

Since Bailliant described his instrument, the ophthalmodynamometer, for determining the systolic and diastolic pressure in the retinal vessels, it has been applied frequently for the aid and study of associated intracranial diseases. Lewy⁷ studied the relation of the diastolic pressure in chronic adhesive arachnoiditis and made his find-

ings a part of the syndrome. Suggestions for the application of this principle in head injuries were carried out by Klar,⁵ who had recorded his findings in twenty patients with commotio cerebri. There were no abnormal objective neurological or ophthalmoscopic findings. Bailliant's ophthalmodynamometer showed a pathologic increase in the tension of the retinal arteries. He believed that this increase was due to an irritation of the vasomotor center in the medulla, and that the contraction of the visual field was due to a hypertonic disturbance with insufficient oxygen in the retina.

Cushing and Eagleton¹ have both found contraction of the visual field in increased intracranial pressure although marked contraction is not an early symptom of this condition. Further studies along this line seem necessary before one can draw very definite conclusions between cause and effect.

According to McMurray,¹¹ edema of the optic nerve is common following head trauma, the optic nerve being involved first, the auditory second, and other nerves by pressure only. One gathers the idea that edema of the optic nerve is present with retinal edema without any actual swelling of the nerve itself. The term edema of the optic nerve is unusual and somewhat vague. These authors have observed retinal edema in a fairly large percentage of traumatic cases, although this symptom is rarely mentioned by other writers.

Vertigo is a very common symptom after head trauma and may, of course, be due to disturbance in the vestibular apparatus or to cerebellar changes. Involvement of the cochlea is less common than of the vestibular apparatus, and a reduction of the hearing is often discovered with the audiometer rather than from subjective symptoms. Vertigo is likely to persist much longer than auditory symptoms, and tests of the vestibular apparatus show abnormal responses.

In thirty-six patients complaining of post-traumatic dizziness, examined by Lithicum and Rand,⁹ abnormal vestibular responses were present in all.

The cause of post-traumatic dizziness is probably both cerebellar and peripheral, as Winkelman and Eckel¹⁶ noted multiple cerebellar hemorrhages at autopsy. They believe these would

have given rise to areas of softening or atrophy plus pial adhesions which would undoubtedly have produced a long period of post-traumatic dizziness if recovery had occurred. Experimental work has further shown that intentional trauma to the head of dogs produced corresponding changes in the vestibular apparatus itself.

The pathologic changes noted in the brain and meninges after head injury are many. One of the most frequent is subarachnoid hemorrhage. Such hemorrhages sometimes give rise to early or late optic nerve changes. Laceration of the brain occurs most frequently on the inferior surface of the frontal and temporal lobes. Peticial hemorrhages in the meninges and throughout the brain tissue are encountered without fracture of the skull or even with no evidence of scalp injury. When accompanied by laceration of the brain tissue, repair may be extremely slow, which undoubtedly explains the prolonged headaches after head injury in at least some of the cases.

Foster Moore¹² observed practically no absorption of a retinal hemorrhage during a period of two years, while Trotter¹⁵ observed incomplete resolution of a brain contusion during operation four years after injury.

Inasmuch as most observers have noticed the greatest injury following head trauma in the region of the frontal lobe it seems reasonable to assume that the optic nerves would not entirely escape. It is probably not possible in many instances to have a definite line of demarcation between a purely functional and an organic field change after such injury. There may be some subtle connection between the two and in some cases they seem closely associated. It seems distinctly unfair to classify individuals as psychic because of marked contraction of the visual fields or even with tubular fields when there is other evidence of organic injury to the intracranial contents.

The question has recently been raised concerning the hysterical nature of marked visual field contraction after head injury. I have been able to find but one explanation for the production of such changes and that is an increased diastolic pressure in the retinal vessels. This does not, however, seem to satisfactorily explain all phases of the situation. The hypothesis is advanced

that the visual field contraction is due to a physiologic block of the retinal impulse due to commotio retinae. It is admitted that commotio retinae, like commotio cerebri, is a vague, unexplained condition. Naturally organic fundus changes are excluded. The field changes are the moderate and marked contractions and possibly the annular scotoma. The evidence to support this hypothesis is, first, that the peripheral retina contains a greater number of synapses than the macula area and consequently a physiologic block would be more readily produced. Central vision being normal, small islands of scotoma are sometimes found in the periphery on the Duane Tangent screen and can be found in no other way. Secondly, moving objects in the peripheral field may actually be seen without the individual being able to discern color or form. This is not so readily observed in hysteria. Lastly, the visual field gradually returns to normal and this occurs before the cessation of other symptoms and without suggestion. In one instance the visual field was improving when the post-traumatic syndrome of dizziness, headache and fatigability were most pronounced. In some cases there are no ocular symptoms whatever and contraction of the visual field is found only by perimetric examination.

In one of McCullough's¹⁰ cases marked contraction of the visual field, symptoms of toxic encephalitis was present, as in the following case:

Case 1.—W. D., aged seven, was swinging on a trapeze on the veranda when he was thrown off the porch and struck the back of his head on some ice. The accident occurred in the latter part of March, 1935. He was picked up unconscious and remained so for several hours. On regaining consciousness he was in a highly excited state which lasted for many days, at times talking incessantly and unintelligently. After a period of complete rest in bed he was finally permitted to get up since there was no evidence of skull fracture and no definite neurologic findings. In the early part of May, however, he began to complain of pronounced fatigue and diplopia. After playing out-of-doors for a short time or remaining in school for a few hours, he was completely exhausted and had to remain in bed for the rest of the day. The diplopia of which he complained was noted only at close range and it was especially when his mother was close to him that he stated that he saw two faces. He was taken out of school and it was at this time that I first examined him. His vision was right 20/30, left 20/30; not improved with lenses. The external structure of the eyes was normal; the muscle balance showed no deviation for distance but diplopia inside of 12 or 14 inches. The

convergence was poor. The retinoscopy under atropin showed a very small astigmatic correction at an oblique axis with only slight improvement of vision. The visual

showed an irregular contraction with some interlacing of the color fields. The neurological examination revealed no evidence of organic brain injury and x-rays

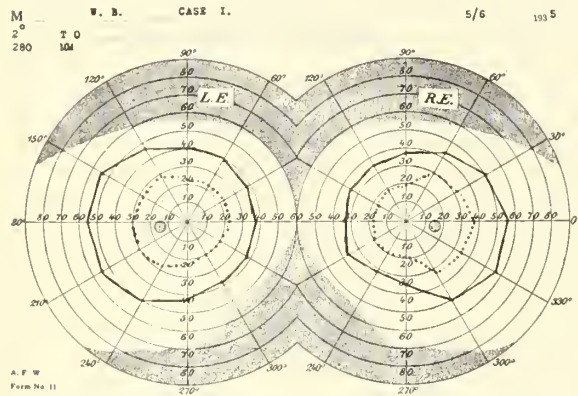


Fig. 1. Case 1. Moderate concentric contraction with symptoms of toxic encephalitis.

fields showed concentric contraction from about 15° to 20° in all meridians.

Comment: There has been considerable improvement in this child's condition following prolonged rest although recovery is not yet complete. Poor convergence plus diplopia at close range without paralysis of the recti muscles suggests a toxic or infectious type of encephalitis; yet this was undoubtedly due to trauma. These symptoms were present without definite neurologic signs and were undoubtedly due to organic brain injury.

Case 2.—F. M., aged forty-two, a carpenter by trade, was injured in an automobile accident the latter part of December, 1933. He was unconscious for a short time, and following this accident he remained in bed for approximately a month. The injuries which he received at the time of the accident were laceration of the scalp in the back part of the head, bruising of both knees and the right ankle. At the time of his examination May 2, 1934, his chief complaint was constant headache and some soreness in both knees and lower part of the back. Vertigo was present on bending forward; there was no nausea or vomiting. He also had marked fatigue and inability to walk more than a few blocks and inability to read except when he first got up in the morning. He also thought that his vision was never entirely clear. He was nervous and easily irritated and had lost approximately seventeen pounds in weight. His vision was right 20/50, left 20/40, which was corrected with a mixed astigmatic correction. He required a plus 75 sphere added to enable him to read the smallest type. His muscle balance was normal. There was a mild conjunctivitis; the fundi were normal. Examination of the visual fields

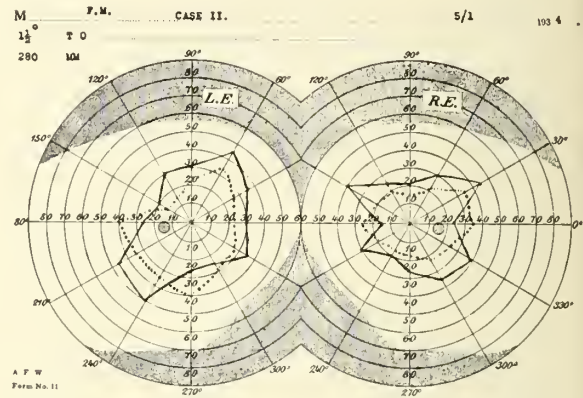


Fig. 2. Case 2. Interlacing color fields with contraction.

of the skull were negative for skull fracture. There were no tests of the vestibular or auditory apparatus.

Comment: In this instance we have a type of visual field commonly seen in hysteria and with it the post-traumatic syndrome of fatigue and vertigo without neurologic evidence of brain injury. The vestibular and auditory tests might have substantiated the findings of a definite brain injury.

Case 3.—L. J., aged fifty-one, was riding in a truck which was struck by a train the latter part of October, 1930. He was thrown up and through the roof and landed on his head about fifty feet away, following which he was unconscious for three or four days. His injuries consisted of a broken nose, many contusions of the body, and bleeding from the nose, mouth and ears. He remained in the hospital for approximately three weeks, following which he went home and remained in bed for about six months. At the time of his examination in August, 1934, he was remaining in bed for several hours each day. His complaints were pain in the left frontal and temporal region, continual ringing in the left ear with reduced hearing, pain in the back of the head extending to the left shoulder, reduction of vision with inability to read, and diplopia when lying in bed on the left side. He also complained of weakness with a tendency to fall on his knees. His weight was approximately 240 pounds as compared to his usual weight of 268 pounds. Examination was: vision right 20/20, left 20/25, which was not improved by the correction of a low refractive error. His near vision was right .62 J and left 1. J with plus 2 added. The muscle balance was normal. The visual field showed a concentric contraction to approximately 10° around the central point of fixation with the color fields corresponding. The visual field of the left eye was definitely not

tubular, the retinal vessels showing some increase in tortuosity and signs of beginning sclerosis. The optic nerves were dirty gray in color with slightly blurred

improvement in the headaches after correction of the refractive error, but these recurred at irregular intervals.

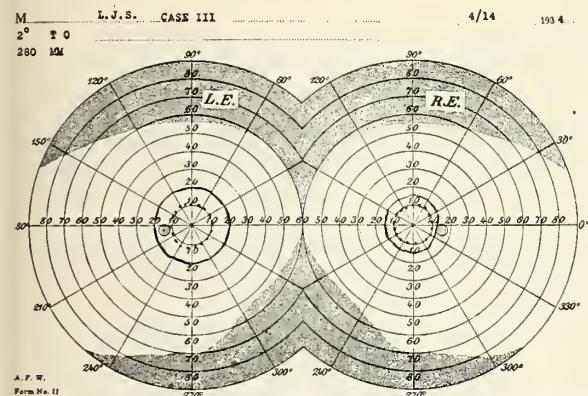


Fig. 3. Case 3. Concentric contraction without evidence of tubularity.

margins and were structurally full without loss of substance. The neurologic examination showed no evidence of brain injury. Vestibular and auditory tests were lacking.

Comment: In this instance we have evidence of a change in the optic nerve to account for the contraction of the visual field, and it lacks the characteristic hysterical tubularity. Vestibular and auditory tests would undoubtedly have corroborated the organic nature of the lesion in the optic nerve although it is possible that a swelling of the optic nerve may previously have been present and could account for the change in the nerve. Central vision was comparatively good.

Case 4.—B. F. L., male, aged thirty-two, was injured in an automobile accident the latter part of October, 1933, following which he was unconscious from seven to ten minutes. He was able to attend to a few business matters and then go home to remain until the latter part of January. He did not remain in bed. His chief complaints when seen in March, 1934, were constant headaches, blurred vision, vertigo, and constant ringing in the left ear. There had been some bleeding from the left ear at the time of the accident.

Examination: Vision right 20/25, left 20/25, improved to normal with the correction of a small amount of farsightedness and astigmatism. The external structures, muscle balance and fundi were normal. There was no evidence of congestion of the retinal veins. The visual fields were contracted to the 10° circle. The neurological examination was negative.

Roentgen plates showed no evidence of skull fracture. An ear examination by Dr. Connor revealed the ear drums to be normal and no abnormalities of hearing with tuning forks and spoken voice. There was some

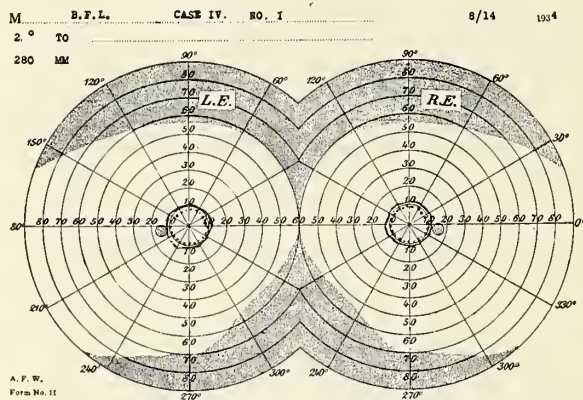


Fig. 4. Case 4. Marked concentric contraction.

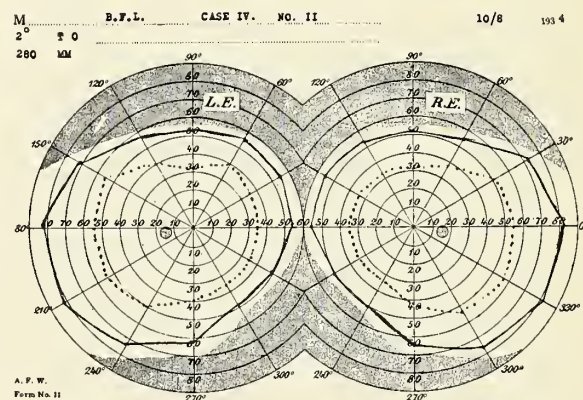


Fig. 5. Case 4. Complete field recovery with post concussion syndrome still present.

By September, 1934, the fields had returned to normal, as shown in the chart. The headaches and tinnitus were still prominent symptoms. In September, 1935, the headaches were still interfering with work and the tinnitus was present, although not annoying.

An audiogram at this time showed a slight decrease in the higher tones of both ears. There had been no settlement of the liability.

Comment: In this instance there were contracted visual fields and post-traumatic vestibular symptoms as an aftermath of trauma. Skull fracture was probably present but without x-ray evidence to corroborate it. Headaches, unknown before the accident, became a prominent symptom. The visual fields were normal long before the cessation of other symptoms. Recovery is not yet complete.

Case 5.—Mrs. F. S., aged forty-three, was injured in an automobile accident on May 14, 1935, when her car was struck from the rear, throwing it into the ditch and causing it to turn over. She struck her forehead and

tion of the visual fields may be due to many causes. Some are purely neurologic, others appear psychic, and in still others both factors

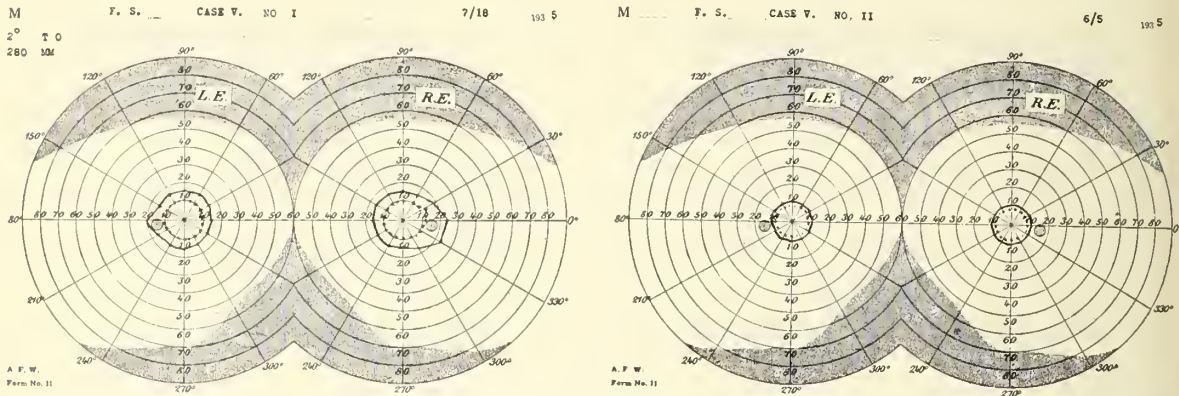


Fig. 6. Case 5. Contraction with improvement taking place before cessation of other symptoms.

nose against the windshield, which caused much swelling of the face and a nosebleed which continued for twelve hours. There was no evidence of a nasal fracture. There was considerable soreness of the chest which had almost completely disappeared when examined on June 5. At that time, the chief complaints were: vertigo and headaches. Vertigo began approximately five days after the accident and was most pronounced in changing posture, especially when bending forward. The vision was right 20/25, left 20/25. The refractive error was a low farsightedness without astigmatism. The fundi were normal without any signs of congestion of the veins or stippling of the retinal tissue. Visual fields showed a concentric contraction to 10°, color fields corresponding. For two months following the accident there was considerable increase in the amount of vertigo which was present on moving the head or even on changing the position of the eyes. Headache became more frequent and in spite of this, July 18, six weeks after the first examination, there was considerable increase in the visual field. Improvement in the visual field has been rapid and is now normal. The vestibular symptoms, although somewhat better, have not as yet entirely disappeared. There has been no settlement.

Comment: The last two cases represent instances of visual field contraction, bordering on psychogenic types, in the post-concussion state. Both showed visual field improvement during an increase of other symptoms. There were no signs of congestion of the retinal vessels. These are explained on the basis of commotio retinae with physiologic block of impulses.

Summary.—Following head injury, contrac-

tion of the visual fields may be due to many causes. Some are purely neurologic, others appear psychic, and in still others both factors

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INTUSSUSCEPTION*

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THE purpose of this paper is to analyze the status of intussusception in St. Luke's and St. Mary's Hospitals as revealed in the hospital records from September, 1925, to September, 1935, and to evaluate this experience in comparison with that recorded in the literature.

By intussusception we mean the invagination of one segment of bowel into the segment immediately adjacent to it. The rule is that the proximal or cephalad segment becomes invaginated into the distal or caudad segment. The only exception is in the rare case in which the disease appears as a complication of gastrojejunostomy where the distal arm of the jejunal loop invaginates into the stomach through the stoma.

The records show that, in the period mentioned, there were 51,698 patients admitted to St. Luke's Hospital and 61,653 patients admitted to St. Mary's, making a total of 113,351. These figures include admissions for any cause as well as individuals who were admitted as patients more than once. No attempt has been made to compute the error which might thus be caused in the estimate of the relative incidence of the disease under consideration. Among the 113,351 patients thus recorded, the diagnosis of intussusception was made in thirty-one. Examination of the records indicates that nine of the thirty-one diagnoses were probably in error, leaving a total of twenty-two proven cases or approximately one case of intussusception in each 5,000 admissions. The incidence of the condition, after deducting the unproven cases, was essentially the same in the two hospitals.

Of the twenty-two proven cases, thirteen, or 59 per cent, of the patients were less than twelve months of age. The next older patient was between twenty-four and thirty-six months of age, while the remaining eight cases were distributed irregularly between the ages of four to twelve years and one lone adult thirty-four years of age. It appears that there is a natural division of these patients into three age groups. In Group I

are all patients less than twenty-four months of age (the period of infancy), leaving all patients older than this, with one exception, in Group II (the period of childhood). In Group III is one case, an adult, probably representing the rare, sporadic occurrence of this disease in the period of youth and adult life. Intussusception is, therefore, emphatically but not exclusively a disease of childhood and preeminently a disease of infancy.

Correlating the factors of sex and age, it is seen that of the thirteen patients in the age of infancy group, six are males and seven are females, and of the nine patients in the age of childhood and adult groups, four are males and five are females. That is, 60 per cent of the males and 58 per cent of the females are in Group I, while 40 per cent of the males and 42 per cent of the females are in Group II. In most statistical studies, the incidence in infancy in males exceeds that in females about two to one.

Intussusception is classified, anatomically, according to the segment of bowel involved, as jejunal, ileal, ileocecal, appendix-cecal, cecocolic and colic. In the series of cases reported here, tabulated on the basis of the anatomic location of the lesion and the age and sex of the patient, of the nine males, in six the lesion was ileocecal, in two ileal and in one appendix-cecal. Of the thirteen females, in nine the lesion was ileocecal, in one appendix-cecal and in three ileal. Thirteen of the fifteen ileo-cecal cases were in the infancy group. The five ileal cases (two male and three female) were all in the childhood group. From these figures, the suggestion arises, first, that the ileocecal type is characteristic of infancy and, second, that the ileal type is characteristic of childhood. Of the two appendix-cecal cases, one was in the childhood and one in the adult group.

The signs and symptoms of intussusception are well known and in no case coming to operation, in the period of infancy group of this series, was the diagnosis missed, although in one patient, seen four days after the onset, the signs of obstruction tended to obscure the picture. In

*Review of cases in St. Luke's and St. Mary's Hospitals, Duluth, Minnesota, from September, 1925, to September, 1935. Read before the Duluth Surgical Society, February, 1936.

the childhood and youth-adult groups, the situation was reversed and confusion was the rule. Five of the nine cases in these groups were diagnosed acute appendicitis, one intussusception or internal hernia, two intestinal obstruction and one intussusception. The reason for this difficulty seems to lie in the fact that in the childhood group we are dealing with a different anatomical type of intussusception and that the clinical picture simulates appendicitis.

The accepted signs and symptoms of intussusception are: intermittent abdominal pain (usually appearing during or shortly after feeding), vomiting, blood in the rectum and a palpable abdominal mass. In infants, the pain is evidenced by the crying and writhing of the patients. The blood may appear in the stools or, in the absence of bowel movement, on the examining finger or the tip of the enema tube. The abdominal mass is not always easily demonstrable. According to Shelley,⁸ if an intussusception is suspected but no mass felt, either because of the abdominal distention or because of the patient's crying, the following procedure will often result in a positive diagnosis. The examiner's right index finger is placed in the child's rectum and his left hand on the abdomen. The assistant then holds the child in a sitting posture, with its face towards the examiner. The tumor will usually drop down between the examiner's hands.

In the infancy group of our cases, definite evidence of pain was recorded in all thirteen cases (100 per cent); vomiting was noted in all cases (100 per cent); blood in the rectum was found in all thirteen (100 per cent); a mass was felt in eleven (85 per cent). The two cases in which no mass was felt were patients whose symptoms had been present twenty-four hours or more and who died two to three hours after operation. These patients presented signs which would render palpation of a mass difficult—distention with general tenderness in one, distention alone in one. Pain and vomiting are the symptoms which first attract attention. A sausage-shaped mass in the abdomen and blood in the rectum are sometimes spoken of as late signs. This statement is not supported by our experience as these two signs were present in all cases in the infancy group seen in the first twenty-four hours. It is probable that the early detection of these

signs is a matter of proper search. The demonstration of the four cardinal symptoms and signs, just mentioned, completes the diagnosis and no further delay is permissible. Active treatment must begin at once for reasons which will appear in the following pages.

When the diagnosis is not certain, or if it is made and the position of the lesion is not located, roentgen examination is advisable. When the condition of the patient calls for as little loss of time as possible, a roentgenogram of the abdomen, made without any preparation, will often show the distended loops above the lesion and indicate the position of the intussusception by the differences in the shadows of the large and small intestine. Le Wald, quoted by Shelley,⁸ has demonstrated graphically the value of the barium enema in the diagnosis of intussusception when the patient's condition permits. If the obstruction is complete, the site will be shown. If it is incomplete, the enema will show the obstruction and may show where the barium filters around the invagination and remains after the enema has been expelled from the bowel.

In the childhood-adult groups of this series of cases, pain was present in nine (100 per cent); vomiting in eight (90 per cent); blood in stools in two (22 per cent) (one an ileal type of 120 hours duration and one an old ileocecal type); a mass recognized in three (33 per cent); localized abdominal tenderness and rigidity in six (66 per cent). The triad, abdominal pain, vomiting and right lower quadrant tenderness with rigidity, goes far to justify the diagnosis of appendicitis. However, in no case in this series is there indisputable evidence that acute appendicitis was the primary lesion, and in four cases, diagnosed appendicitis, the surgeon and pathologist found very slight evidence of disease in the appendix. One surgeon frankly stated that the appendix "shows no evidence of inflammation." The diagnosis of appendicitis was made in four of the five ileal cases and in one of the two cases of intussusception of the appendix into the cecum. In this case, the appendix had a large fecalith at its base and, as the intussusception was being reduced, a perforation was discovered in the appendix, but whether the condition of the appendix became acute before or following the invagination is open to argument. The fact that every appendix which becomes part of an

intussusception, regardless of the anatomical variety, appears red and swollen on disinvagination, bears directly on this point. The second case of appendix-cecal intussusception was, properly enough, diagnosed intestinal obstruction, as was one of the two cases of ileocecal intussusception appearing in this age group. One ileocecal case was diagnosed as such and the diagnosis in the fifth ileal case was "intussusception or internal hernia." It proved to be the former, headed by a gangrenous Meckel's diverticulum.

The end-results, when studied in connection with the age of the patient and the duration of the symptoms before treatment, emphasize the folly of procrastination and the imperative necessity of positive action in the presence of suspected intussusception. In the infancy group, there were five patients who were operated on from twenty-four to ninety-six hours (average 62 hours) after the onset of symptoms. Four of these patients died post-operatively within three hours of shock; one lived twenty-four hours; none survived. Eight were operated on between two and nineteen hours (average $7\frac{1}{2}$) after the onset of symptoms. Six had uneventful recoveries; one died in four days of gangrene, perforation and peritonitis; one died 6 weeks later of pyelitis and sepsis, the intussusception having been completely cured. A mortality rate of 25 per cent for the cases operated on early as compared with a rate of 100 per cent for those operated on twenty-four hours or more after the onset of symptoms carries its own lesson. It also suggests the advisability of revising our conception of the proper pre-operative, operative and post-operative management of these late cases—a subject which deserves consideration by itself and cannot be fully dealt with here. The total death rate in this group was 54 per cent. Our results do not suffer out of reason, however, in comparison with results elsewhere. Thomsen of Copenhagen reported a series of thirty-three cases all operated on, of which seventeen were recent with no deaths, and sixteen were old with thirteen deaths (eighty-one per cent).

In the childhood-adult groups, results were quite different. The duration of symptoms was twelve, twenty-four, twenty-seven and thirty-six hours in four cases, 72 hours in two, 96 hours in two and 120 hours in one case; an average duration of symptoms before operation of 62 hours.

There was one death in this group. This occurred in the patient whose operation was delayed five days, giving a death rate of 11 per cent, as compared with 100 per cent for cases of similar duration in the infancy group. All cases of the childhood-adult group, with one exception, were so-called old cases and the one death was in the case longest neglected.

Comparison of these two groups emphasizes the rapidity with which the infant's resistance to operation is broken down and the imperative necessity of prompt diagnosis in this group. Treatment must be prompt and active. Procrastination is fatal.

Spontaneous recovery rarely occurs without operation. It is probable that no intussusception which has reached a state of engorgement sufficient to cause the appearance of blood in the rectum ever disinvaginates spontaneously, but the intussusception may slough and the patient survive. Osler⁷ mentions a specimen of small intestine 17 inches in length which was passed by a boy who had symptoms of internal strangulation and completely recovered. Gron⁴ describes the case of a girl, four years old, who had acute invagination. Three weeks after the onset, a necrotic segment of colon 6 cms. in length was discharged from the rectum. Three and one-half years later, this patient required resection of the proximal colon because of stricture.

The cause of intussusception is, essentially, irregular peristalsis. It has been observed that, in the localized peristalsis caused by the Faradic current, it is the drawing up of the receiving layer by the contraction of the longitudinal coat and not the descent of one portion into the other which occurs primarily. Invagination may follow any sudden, limited and severe peristalsis. Occasionally tumors and other anatomic abnormalities of the intestine may favor intussusception. In about one-half of the cases described in the literature, no definite inciting cause appeared; in the remainder, diarrhea or habitual constipation existed. In our series of twenty-two cases, there was a Meckel's diverticulum in one, constipation and castoria in one, diarrhea, vomiting and castor oil in one, a slight cold in two, intestinal influenza and cathartics in one, mild bronchitis and frequent stools in one, which might be regarded as causes predisposing to irregular peristalsis. In fifteen cases, the disease

appeared, without warning, in previously well individuals.

A number of papers have appeared in which treatment of intussusception in infants by barium enemas under roentgenologic control has been advocated. Fruchard and Peijnaux,³ writing from Paris in 1931, mention a series of fourteen cases thus treated, with cure in nine. In three cases, the enema revealed the necessity of immediate operation, which was done with good results. In one case, there was doubt of the roentgen interpretation, so operation was done, successfully, and in another case the roentgen findings were misinterpreted, leading to delay and death. It is pointed out that the treatment by barium enemas should not be used unless there are surgical facilities at hand, since immediate operation is necessary if the preliminary treatment is unsuccessful. Of the ten cases treated without operation, there was one death directly traceable to the treatment—a mortality rate of ten per cent.

Sjöström⁹ of Stockholm reports (1934) that, for the three years preceding, all cases of intussusception admitted to the Lund Hospital were referred to the roentgen department. In addition to the establishment of the diagnosis, an attempt was made in almost all cases to disinvaginate under fluoroscopic control with the aid of a barium enema under pressure, employing massage and taxis. The successful cases were kept under observation; the failures were operated immediately. Disinvagination by enemas was successful in twenty-two out of thirty-eight cases. In the remaining sixteen, disinvagination was accomplished by operation. It is the ileocecal type that can be reduced by barium enemas in this fashion. In nineteen cases of this type, failure was encountered only once. The non-ileocecal type can be diagnosed roentgenologically and should be operated immediately. Cases in which the history of illness is less than twenty-four hours are most favorable. Taxis should not be attempted when the history of illness exceeds forty-eight hours. This is not an independent method; operating facilities will be needed in about one-third of the cases.

Thomsen,¹⁰ of Copenhagen, already quoted, reported thirty-three cases treated by operation without attempting bloodless disinvagination in the years 1917 to 1932. Of the seventeen patients operated on within twenty-four hours of

the onset of symptoms, all recovered; of the sixteen patients operated after a longer interval, three recovered and thirteen died.

In discussing this matter, Shelley, of New York, says: "The reduction of an intussusception may be nonsurgical, accomplished by the use of pressure enemas or air insufflation; but if this method is successful, it should be followed by abdominal exploration to make certain that reduction is complete and that there is no gangrene, perforation or tumor present."

From a study of the literature and the consideration of our Duluth experience, it appears that the soundest course to pursue in the treatment of intussusception is as follows: In the presence of the four cardinal symptoms, operate without delay, the earlier the better. If the diagnosis is in doubt, do not delay but insist on immediate roentgen examination and if intussusception is found, operate at once. We do not advocate non-operative reduction under the fluoroscope. A small, early intussusception is easily reduced and the operative procedure is completed; there is probably no point in attempting to suture the bowel somewhere to prevent recurrence. Many of the larger, later and more edematous intussusceptions may be reduced. Careful manipulation, rolling or milking back of the intussusciens while constant but gentle backward pressure is maintained in the apex of the intussusception will usually bring about reduction. A flat, blunt dissector or the handle of the knife introduced inside of the neck may aid the reduction. If the intussusception is wrapped in moist gauze and even, steady pressure applied for a few minutes, with great care, the edema may be so relieved that reduction becomes possible. Both Farr² and Montgomery⁵ recommend the aid of air insufflation of the colon in the reduction of all intussusceptions at the time of operation. This simplifies the locating of the lesion, reduces the less severe ones without handling of the intestine other than for exploration and makes possible reduction in some of the advanced cases which otherwise might not be reducible. The procedure should at all times be under visible control. The air empties readily through the rectum.

Irreducible intussusceptions offer a far graver problem. This is the type of case found with increasing frequency as the cases pass from the

recent (duration of twenty-four hours or less) into the old (duration of twenty-four hours or more) categories. In cases in which we find that gangrene or perforation has not occurred, the Brown¹ operation may be attempted. In carrying out this procedure, one blade of the scissors is inserted under the edge of the neck of the intussusception and the neck is cut across parallel to the long axis of the bowel. If gangrene or perforation of the intussusceptum has occurred, do not attempt reduction of the intussusception but make a lateral anastomosis between the afferent and efferent loops of intestines, adding fixation of the invagination by placing a few interrupted sutures through the serosa and muscularis of the two portions of the intussusception at its point of entrance. This prevents leakage as the invaginated portion sloughs off (Montgomery⁶). At times, this procedure will seem inadvisable, either because the condition of the patient forbids even the manipulation necessary for the anastomosis, or because the condition of the bowel makes its retention within the abdomen dangerous. Under these circumstances, do the modified Mikulicz operation. This is performed by bringing the involved loop out, preferably through a separate incision, suturing the two "barrels" leading to the intussusception together and closing the wound. An extra-abdominal ileostomy is done in the following manner: A number 16 soft rubber catheter is inserted into the proximal end of the intestine just distal to its emergence from the incision and held in place by a purse-string suture. The catheter should extend several inches into the intestine. The loop is clamped off with one or two large clamps, and cut away at once with the cautery. The clamps are left on until there is necrosis of the end of the intestine and leakage occurs. This occurs usually on the fourth or fifth day. In the meantime, the wound is protected and the obstruction is relieved by the catheter. When healing occurs, a clamp is put on with a jaw in each end of the intestine and by pressure necrosis the lumina of the two ends are joined. This should be done as deeply as possible to insure a large connection. Later, closure is done by the intraperitoneal or extraperitoneal method, whichever is indicated.

Operative procedures other than those just described have been advised, but it is probable

that such procedures will be found superfluous if one has in mind the general principles which are embodied in the preceding discussion.

Primary resection with anastomosis is not suitable for infants. This procedure was followed by death from shock in three hours, or less in three of the five fatal old cases in our infant group. In another of the five cases, the ileum was anastomosed to the cecum and the gangrenous bowel placed externally, with death in three hours, and in the fifth case death followed what was described as an "easy reduction" in twenty-four hours from pneumonia. The hospital record in this case is quite confusing but apparently this patient was under observation in the hospital between three and four days with evidences of intestinal obstruction before operation was undertaken.

This acute susceptibility to operative trauma was not found in the childhood group as has already been pointed out.

In operating on infants for intussusception, there are a few points which deserve special mention. In the first place, all operations for intussusception should include a search for a possible mechanical cause. Tumors have repeatedly been described at the head of an intussusception and, when present, should be removed in the best way available. Sometimes, they are multiple and produce recurrence of symptoms. In a personal case (seen in consultation with Dr. C. H. Schroder) the appendix was kinked by adhesions and appeared to produce a dimple in the cecum, predisposing to recurrence, and was, therefore, removed with full knowledge of the general opinion that such an additional procedure is unwise in a condition already precarious. Open drop ether is the anesthetic of choice. Preoperative administration of saline and glucose, and, in some cases, blood transfusion is advisable; likewise, similar immediate postoperative treatment will be found well worth while. To protect the skin, if the Mikulicz technic has been followed, and there is leaking of intestinal contents, a paste of kaolin and glycerine, or frequent irrigations with tenth-normal hydrochloric acid in 10 per cent peptone will be sufficient.

The general conclusion which a study of our cases, in the light of experience elsewhere, appears to warrant is, that early diagnosis, fol-

lowed by prompt, careful surgical management, offers the best hope in the treatment of this serious disease.

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CASE REPORTS

BRONCHIAL ASTHMA

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THE following case report is felt to be of interest because of the rarity of death due directly to bronchial asthma.

J. D., white male, fifty-seven years of age, a retired farmer, had his first attack of bronchial asthma in 1931. The attacks at first were mild, but increased in severity and frequency. Between attacks he had some cough with expectoration of frothy mucus, rarely mucopurulent material. During the past five years his weight decreased from 140 pounds to 105 pounds, and in 1934 he was forced to give up farming because of weakness. Roentgen examination of the lungs in January, 1934, revealed no evidence of disease; in May, 1934, and in April, 1935, the examinations were inconclusive, but on September 19, 1935, a definite bilateral pulmonary tuberculosis with cavitation in the right upper lobe was discovered. Examination on admission to Glen Lake Sanatorium, October 27, 1935, showed bilateral fibroid pulmonary tuberculosis involving the right upper lobe and the apex of the left lung, with the pleura over both apices thickened. The mucous membranes of the nose were atrophic. There was moderate atrophy of the prostate. Diagnosis was moderately advanced pulmonary tuberculosis and bronchial asthma. He had rather severe hayfever during the fall of 1935, which came to an end with the first frost. No history of hayfever before 1935 and no history of other allergic manifestations except bronchial asthma could be obtained.

It was felt that, while he undoubtedly had pulmonary tuberculosis, most of his disability was due to bronchial asthma. During the first five weeks in the Sanatorium, a daily dose of ephedrine sulphate, grains $\frac{3}{8}$, by mouth, gave him ample relief from symptoms. For the next eight weeks he required no medication. Then the asthmatic attacks recurred with increased severity once or twice a week, requiring ephedrine sulphate, grains $\frac{3}{8}$, by hypodermic injections. For a week before his death he was given ephedrine sulphate, grains $\frac{3}{8}$, once or twice daily, usually with complete relief.

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On March 27, 1936, he received $\frac{3}{8}$ grains of ephedrine sulphate hypodermically at 11:15 a. m. with the usual relief. This was repeated at 5:15 p. m. because of another attack. This time he obtained very little relief from the ephedrine but apparently had complete relief from 0.5 c.c. of adrenalin hydrochloride. He received the usual bed time care and his condition appeared as usual at 9:00 p. m. At 9:30 he requested a bedpan. According to his roommates, while attempting to use the bedpan, he had another asthmatic attack and fifteen minutes later suddenly collapsed and expired.

Roentgen examination of his lungs showed no change during his residence in the Sanatorium. He expectorated no muco-purulent sputum, and tubercle bacilli were not demonstrated in his sputum. The urine was normal. The blood examination on admission was as follows: Hemoglobin, 92 per cent (Sahli); red blood cells, 4,640,000; white blood cells, 6,000; polymorphonuclear leukocytes, 51.5; lymphocytes, 22; mononuclears, 4.5; eosinophiles, 21.5; basophiles, 0.5. On later counts the blood picture was normal and the eosinophiles had dropped to 1.5 per cent.

At autopsy the body was found to be markedly emaciated; the upper third of each pleural cavity was obliterated; the spleen contained the scar of an old infarct; and each kidney presented several pits due to athero-sclerosis, the right kidney also showing one small fibroma. Examination of the central nervous system revealed nothing of note.

The heart weighed 250 grams. No dilation or hypertrophy of any chamber was present. The valves and myocardium appeared normal. The coronaries showed nothing of note.

The lungs weighed 1,570 grams. The parenchyma was emphysematous, but no bullae were evident. On palpation, besides the emphysema, nodules in the apex of each lung could be discerned. Before injection of the trachea with formalin, a portion of the lower lobe of the right lung was sectioned and the small bronchi were found to be filled with thick, tenacious, mucous plugs. After fixation, detailed examination of each lung revealed the following: The apices were firm and contained fibrous and some caseous tuberculosis, more marked on the right side. There was no evidence of cavitation. The apical pleura, as well as the interlobar pleura on the right side, were thickened. Tuberculosis was present only in the apices and in the tracheo-bronchial lymph nodes.

Almost every small bronchus contained a mucous plug which, in several instances, extended toward the trachea into bronchi, 0.6 cm. in diameter.

Microscopically the tissues revealed no additional diagnosis. The fibrotic and caseous areas of the lungs,

and the thickened pleura showed active pulmonary tuberculosis.

The walls of the bronchioles were thicker than normal due principally to a hypertrophy of the smooth muscle. The mucous glands were filled with secre-

tion. The plugs were mucous in nature and contained occasional eosinophiles and mononucleated cells as well as some desquamated columnar epithelium. The mucosal portions of the bronchiolar walls were infiltrated with eosinophiles and mononucleated cells.

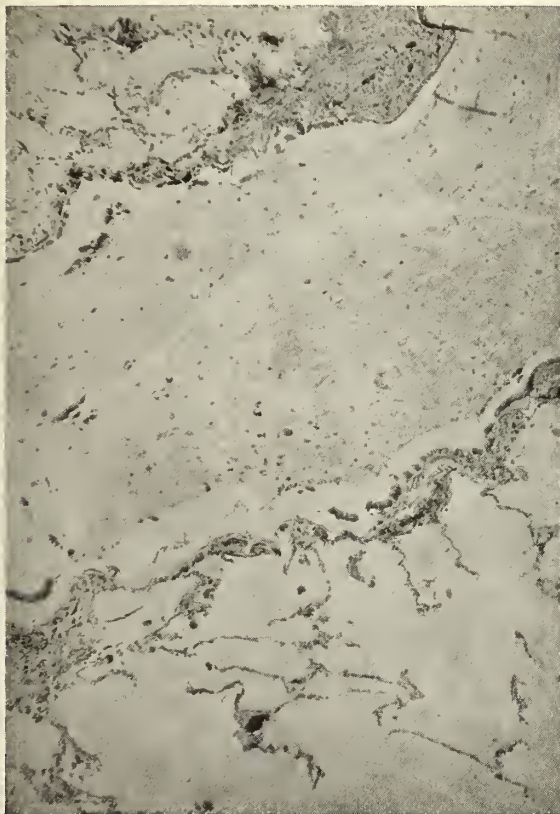


Fig. 1. Mucous plug in a small bronchus. Photomicrograph.

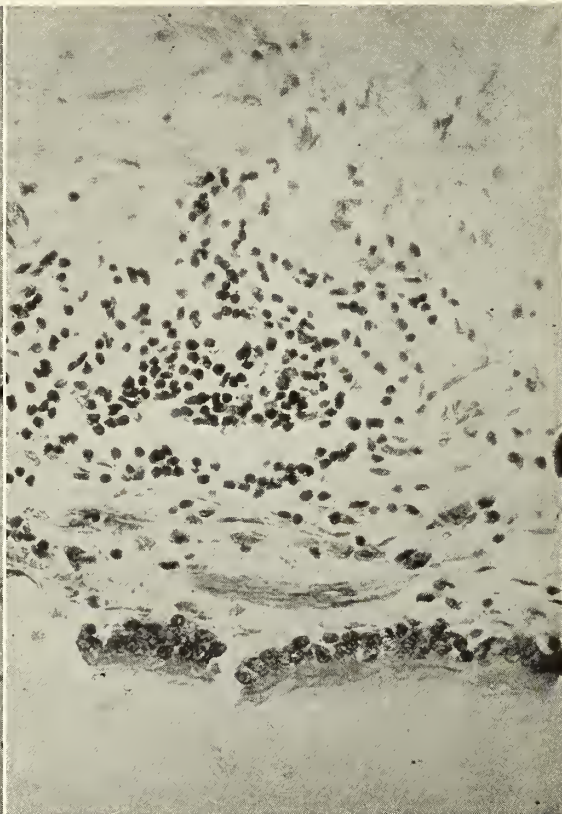


Fig. 2. Infiltration of bronchiolar wall by mononuclear cells and eosinophiles. Photomicrograph.

FATAL ASPHYXIA IN A CASE OF RETROPHARYNGEAL ABSCESS

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UNDER ordinary circumstances the diagnosis and management of a retropharyngeal abscess is no serious problem, and the prognosis is usually favorable. However, the following case will illustrate the exception to the rule and stress the necessity of ever being on the alert for a disastrous complication in a morbidity not itself considered of a serious nature.

A female child, one and one-half years old, Mexican, was first seen at the Outpatient Department of the Ancker Hospital, on February 21, 1935. The mother of the patient stated that the child had had difficulty in swallowing food for the past eight days and that she had noticed a swelling on both sides of the neck and a discharging right ear. Examination revealed a right acute otitis media; inflamed, hypertrophic tonsils nearly touching each other; and a marked bilateral cervical adenitis. As the child's dysphagia was consid-

ered of a mechanical nature, due to the large tonsils, she was discharged and the mother was advised that a tonsillectomy would be necessary after the inflammation had subsided. Late in the evening of the following day, the patient was again brought to the hospital, the mother stating that the child's difficulty in swallowing had increased and that she also seemed to have some trouble in breathing. The possibility of a diphtheritic throat infection induced the attending physician in the receiving room to admit the child to the contagious section of the hospital, where cultures were taken and palliative treatment administered.

The following morning, February 23, I was asked to see the child. Examination revealed a poorly nourished female child, lying quietly in bed, but seemingly very apprehensive. The skin was pale. Respiration was shallow and slightly accelerated, but there was no stridor. A bilateral extensive adenopathy colli was noticeable involving the submaxillar and especially subauricular region, which was hard in consistency and tender on pressure. The oral inspection revealed hypertrophic, inflamed tonsils, and a markedly inflamed bulging tumor in the pharynx, the size of a large walnut. On palpation the tumor mass was soft and fluctuating. The temperature was 101°.

There was little doubt but that we were dealing with

CASE REPORT

a far advanced, retropharyngeal abscess, and the child was immediately taken to the operating room for incision of the abscess. Under my supervision, the resident of the department performed the operation. The

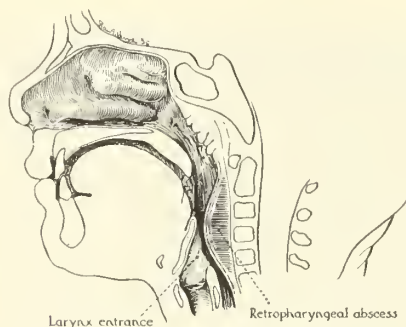


Fig. 1. Schematic drawing showing the retropharyngeal abscess partially occluding the larynx entrance.

patient was put in an extreme dependent position (naturally no anesthetic was used), a Lockett mouth gag was inserted, and the tongue depressed with a metal tongue depressor. At that moment, before an incision could be made, and without showing any of the symptoms which usually accompany attacks of asphyxia, the child stopped breathing. The mouth gag was immediately removed, the tongue pulled forward, the head lowered still more, and artificial respiration induced, but without avail. Assuming a laryngeal obstruction was responsible for the asphyxia, a tracheotomy was done, which also was ineffective, as were all other resuscitating measures. Unfortunately, consent for an autopsy could not be obtained.

In analyzing this case, the sudden and nearly asymptomatic attack of asphyxia stands in the foreground. Was the main causative factor of it a mechanical laryngeal obstruction, or some other intercurrent morbidity? According to the history, the beginning of the abscess formation was at least ten days prior to the admission, it increased in size and gravitated downwards in the loose retropharyngeal space until it reached the mouth of the esophagus, which is formed anteriorly by the cricoid cartilage and posteriorly by the constrictor pharyngis inferioris, and here the sagging stopped. From then on expansion of the abscess was directed forward, in the region of the aditus laryngis, and as from day to day it became more voluminous, so the laryngeal and esophageal obstruction became more pronounced (Fig. 1).

From Figure 2 one can readily see how the depression of the tongue had aggravated the condition, creating a complete laryngeal obstruction out of a partial one. Depressing the tongue extends its base backward and downward, against the epiglottis, which procedure under normal conditions causes no significant interference because ample breathing space is left, but in our case this space was already reduced to a small slit, and manipulation with the tongue depressor completely obliterated it.

However, we further must explain the fact that release of the tongue failed to release the laryngeal ob-

struction, and secondly, that there were only comparatively slight symptoms of asphyxia during the course of the morbidity and at the time of the operation. An

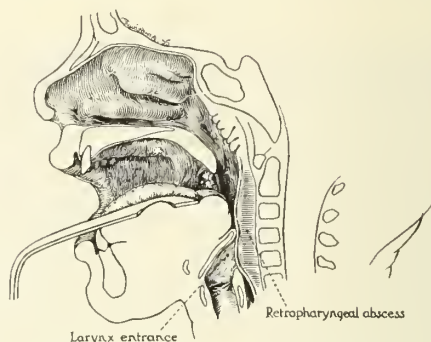


Fig. 2. Schematic drawing showing the retropharyngeal abscess and the depressed tongue causing complete laryngeal obstruction.

explanation of the latter question will also answer the former one. The laryngeal obstruction was not a sudden one, such as results from a foreign body, laryngeal edema, and so on, but a gradual one. The respiratory mechanism, namely the taking in of oxygen and expulsion of carbon dioxide, was not shut off suddenly, as it is in the previously mentioned cases, but day by day it was diminished, and as a result the whole organism and respiratory center adapted themselves to these altered metabolic conditions, and so we did not find labored breathing, rapid pulse and cyanosis. However, on the other hand, the threshold of oxidation was reduced to such a minimum that any further interference in the intake of oxygen, although for a few moments only, brought on suffocation, because no reserve was left to stimulate the respiratory center; naturally, all resuscitating methods failed for the same reason.

According to Henderson,¹ the supply of oxygen is the principal factor controlling the sensitivity of the respiratory center. A slight oxygen deficiency causes the appearance in the blood of some substance that increases the respiratory sensitivity, while on the contrary, extreme oxygen deficiency diminishes the sensitivity to such an extent that an abnormally strong stimulus is required to induce activity. Therefore, the all-important factor necessary to avoid such a disastrous result would have been an early diagnosis. Every day of delay enhanced all those factors responsible for the asphyxia, namely the laryngeal obstruction and the accompanying oxygen deficiency and alkalosis of the blood. A correct diagnosis and proper treatment forty-eight hours earlier would probably have saved the child's life, as at that time the oxygen reserve was not so completely depleted, and even a complete momentary laryngeal obstruction would not have resulted in fatal suffocation, as enough stimuli would have been left to excite the respiratory center, after relieving the obstruction.

However, there was no way of determining these
(Continued on Page 470)

CLINICAL PATHOLOGIC SEMINAR*

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Aneurysm

Case 13.—A man, fifty-two years of age, was admitted to hospital March 5, 1936. In August, 1933, he had been admitted to the dispensary because of pain in the chest, dyspnea and wheezing in his throat. Blood Wassermann ++++. He gave a history of gonorrhea thirty years ago but, except that the foreskin was removed at that time, there was no history of primary or secondary syphilitic manifestation. Examination showed normal pupillary reflexes; pupils equal, although the right one was oblong. The heart was enlarged to the anterior axillary line in the sixth interspace; a to and fro murmur was audible in the second right interspace; a diastolic murmur at the apex. The pulse was waterhammer in type and there was capillary pulsation. Blood pressure about 140/30. Reflexes normal.

Blood: hemoglobin 74 per cent; red cells 4,290,000; leukocyte and differential count normal on two occasions. Urine: no albumin except on one occasion when a faint trace was recorded; none to occasional leukocytes. Spinal fluid: negative Wassermann; no rise in the colloidal curve. X-ray showed the heart to equal 53 per cent with left ventricular enlargement; marked widening at the base and upper mediastinum. Electrocardiogram showed left ventricular preponderance, a high take-off of the T wave in lead 2 and a flattened T wave in lead 3.

In spite of continuous antisyphilitic treatment the blood Wassermann remained ++++ till January 26, 1935, when it became negative. The patient was given three months rest, at the end of which time the Wassermann was again ++; treatment resumed but the Wassermann had become ++++ by August 31, 1935, and continued so despite treatment.

In the cardiac dispensary he complained of pain in the sternum, in the right side and also in the left chest and left arm. The pain, however, disappeared entirely and the cough and dyspnea persisted, although not so extremely marked. The condition remained stationary until on March 2, 1936, when he had increase of dyspnea.

On March 4 he felt much improved and walked a distance of about two miles without getting short of breath. On the following morning, March 5, he became very dyspneic and entered the hospital. Examination showed no pupillary reactions to light or accommodation. A few râles over the right lung base and coarse râles and wheezes at the left and right apices anteriorly. Blood pressure 126/50. The knee jerks were absent. Soon after admission he became more dyspneic. His breathing became labored and he developed cyanosis, then suddenly developed several convulsions and fell over dead at 3 p. m. on March 6.

At the postmortem the heart measured 15.5 cm. in

width. The large branches of the pulmonary artery showed no evidence of thrombi or emboli. There was a large bulging mass in the superior mediastinum which proved to be an enormous aneurysm. The heart appeared larger than normal; estimated weight 500 grams. The mitral, tricuspid and pulmonary valves were normal. The leaflets of the aortic valve were definitely shortened and separated at their commissures and showed cordlike edges. The coronary orifices did not appear narrowed; the arteries showed some calcification but no reduction in size of the lumens. There was definite left ventricular hypertrophy. The myocardium on section was paler than normal and showed small well defined areas of fibrosis. The entire aortic root, the arch of the aorta and the descending portions for a distance of several centimeters was definitely dilated and thin. The inner surface showed dark atheromatous streaking and many calcified plaques. This process ended abruptly in the descending aorta. The aneurysmal sac measured about 13 cm. in diameter; immediately opposite the trachea there was a defect in the wall of the aneurysm, 2 cm. in diameter; the edges were rounded and the defect was so sealed off that no free hemorrhage occurred into the mediastinum, trachea or esophagus. There was a bulging mass in the trachea, however, 3 cm. in diameter. The tracheal cartilaginous rings were eroded and the mucous membrane over this mass was reddened. The mass definitely obstructed the trachea. Other findings not significant.

Diagnosis: Syphilitic aneurysm of the aorta with syphilitic aortitis and valvulitis (aortic).

Comment.—The syphilitic hearts causing death comprise approximately 10 per cent of all cardiac failures. Death occurs in four ways: (1) aortic insufficiency, 46 per cent; (2) rupture of aortic aneurysm, 28 per cent; (3) narrowing of coronary orifices, 24 per cent; and (4) gumma of the myocardium, 2 per cent. Two clinical considerations worth noting are that syphilis of the aortic valve does not cause stenosis and myomalacia seldom occurs following narrowing of the coronary orifices. A pericardial rub which is common with coronary sclerosis is not detected.

Pulmonary Embolism

Case 14.—A white man, fifty-one years of age, was admitted December 5, 1935. He had been struck by an automobile shortly before admission and was found lying in the street. He was totally unconscious and no history was obtained. Examination showed an odor of alcohol on his breath. He did not respond at all. There was a stablike laceration behind and above the right ear with some edema of the surrounding structures. There was bulging of the right drum with evidence of blood behind the drum. There was marked

*Continued from June, 1936, issue.

laceration of the lower eyelid (right?). There was no blood in the nose. The abdomen was quite tense. The blood pressure was 90/60, the temperature 96°, respirations 20, pulse 72 and very weak. There was dislocation of the left shoulder.

The urine on December 7 was negative except for a heavy trace of albumin and an occasional granular cast. The blood Wassermann was negative. Blood December 10: hemoglobin 63 per cent, 3,600,000 red cells; 12,850 leukocytes; 70 per cent polymorphonuclears, 16 per cent lymphocytes, 8 per cent monocytes.

X-ray on December 12 showed the left knee to be negative. The upper end of the fibula showed a fracture line. The left hip was negative. There was extensive comminuted fracture of the upper outer portion of the left ilium showing considerable separation of the fragments. There were fractures of the ninth, tenth, eleventh and twelfth ribs on the left posteriorly and of the fifth and sixth on the left in the anterior axillary line. There was no evidence of fracture of the skull.

The dislocated shoulder was reduced in the receiving room. The patient was sent to the ward and given the usual treatment for shock. Three or four hours after admission, consciousness began to return. The blood pressure remained low for ten or twelve hours. The patient was incontinent. Consciousness had returned fairly well within the first twelve hours after admission. The voice was very weak for the first two or three days; this slowly came back. His mental state remained rather hazy for quite a while. Two days after admission, a note was made that the patient had a right facial paralysis but the remainder of the neurologic examination was negative. After the first three or four days he did quite well. The left leg was placed in a posterior molded splint and he had few complaints except pain in the chest on coughing. The facial paralysis persisted during his stay in the hospital. On the night of the 28th day in the hospital he had been feeling very well. However, he complained to the nurse that he was having some pain in his chest and considerable cough. The following morning at 3:50 he died rather suddenly without any further complaints (January 3, 1936).

The significant postmortem findings were the absence of edema of the extremities, a normal heart, an embolus filling the right main pulmonary artery, smaller emboli in the secondary branches of the left pulmonary, fractures of the skull, ribs, pelvis and left fibula. No site for the primary thrombosis was found. Diagnosis: Pulmonary embolism.

Comment.—Sudden death in individuals of this age might conceivably be attributed to coronary disease, cerebral hemorrhage and the condition, which is least likely to be thought of as a complication of fracture, namely, pulmonary embolism. The occurrence of pulmonary embolism after fractures is not well known and occurs most frequently following fractures of the lower extremities. Contrary to what might be expected it is usually with simple rather than with compound fractures that there is found embolism of the lung.

Anuria

Case 15.—A man, sixty-five years of age, one year ago had resection of the median lobe of the prostate. History otherwise negative. He entered the hospital May 12, 1936, because of urinary frequency. On the day of admission a stricture of the posterior urethra was incised and dilated and a small amount of prostatic tissue was removed transurethrally. 100 mg. of novocain was used as a spinal anesthetic. Blood pressure 110 systolic. At the close of the operation he went into immediate shock and the blood pressure went down to 60 systolic. The hemoglobin before operation was 60 per cent; there was no unusual bleeding during the operation but, because of the low hemoglobin, he was given 500 c.c. of blood and some gum acacia on the day of operation.

On the first day after the operation 300 c.c. of urine was passed; no more was passed until the fourth day when 200 c.c. of bloody urine was obtained by catheter; on this day he received 300 c.c. of 30 per cent glucose intravenously and a blood transfusion. Further transfusions were given on the sixth and seventh postoperative days; these caused the hemoglobin to rise but little. One postoperative hemoglobin was 62 per cent. He passed no urine after the fourth day except that during the last two days about 5 c.c. was recovered on two or three occasions by catheter.

Blood urea nitrogen 35 mg.; creatinin 2 mg. on the fourth day; on the seventh day blood urea nitrogen was 71 mg.; on the eighth day 123 mg. with creatinin 10.7 mg.; on the ninth day 98 mg.; on the tenth day 130 mg. with creatinin 5 mg. The day before death pulmonary edema appeared. He was clear mentally until the morning of the day of death.

At autopsy the prostate showed the evidences of recent transurethral resection; it was of normal size. The heart was essentially negative. The lungs showed moderate generalized edema. Each kidney weighed 170 grams; the surfaces were smooth. On section the kidney substance was opaque, pale and swollen; the usual markings were scarcely perceptible. The pelves and ureters showed nothing of note. The bladder contained only a few drops of bloody urine.

The cecum and ascending colon showed numerous ulcers of the mucosa up to 2 cm. in diameter; the mucosa between the ulcers was hemorrhagic. The mucosa of the remaining portion of the colon and of the rectum was hemorrhagic in places. (Uremic colitis.)

Microscopic examination: The glomeruli of the kidney are essentially normal; there is moderate pyelonephritis; some of the tubules are dilated; many of the tubules are filled with blood pigment. Diagnosis: anuria of undetermined origin.

Comment.—This is one of the rare but definite cases in which there is renal insufficiency going on to death with no demonstrable anatomic cause. In this case the cause of the anuria lies between a transfusion reaction and operative shock from dilatation of the urethral stricture. In certain cases of anuria following transfusion reaction the tubules are blocked by blood pigment but in this case there is not enough blood pigment in the tubules to cause renal insufficiency. In

other cases of anuria, such as that accompanying diabetic coma, no change is evident in the microscopic sections of the kidney except dilatation of the tubules.

Stomach Carcinoma

Case 16.—A man, fifty-five years of age, was admitted to hospital June 9, 1926, with complaint of not feeling well since an attack of stomach "flu" in October, 1925. From that time he had had slight occasional epigastric pain, occasional belching and vomiting and some anorexia. There was no regular connection between taking food and the gastric distress. There had been loss of weight of twenty pounds since October, 1925.

Examination showed blood pressure 100/58; occasional extrasystoles. X-ray and fluoroscopy of the gastrointestinal tract showed a filling defect of the pyloric portion of the stomach and the duodenum; marked dilatation of the stomach; peristalsis continued to the pyloric portion and was almost absent beyond this; the stomach was markedly ptotic, hanging down to just above the symphysis pubis. There was marked retention of barium in the stomach; at six hours there was very little in the duodenum or the small intestine. X-ray diagnosis was malignancy of the pyloric portion of the stomach. Electrocardiogram showed tachycardia, auricular extrasystoles and right ventricular preponderance. Posterior isoperistaltic gastroenterostomy was done; there was found a large rounded tumor of the pyloric portion of the stomach adherent to the liver; no extension or metastasis noted. No attempt was made to remove the tumor. The appendix was removed.

Hemoglobin on June 9 was 50 per cent with 2,890,000 red cells; on June 24 hemoglobin was 35 per cent; red cells 2,310,000; white cells 9,100; on July 3, hemoglobin was 35 per cent; red cells 2,900,000. Gastric analysis just before the operation showed 84° total acidity with 45° free acid.

After the operation the patient got along well until the fall of 1935 when he received some digitalis for cardiac decompensation. About April 20, 1936, he began having nausea and vomiting with epigastric pain which became progressively worse. He had been working until

this time. He was admitted to the hospital about May 10 and after a few days transferred to another hospital. The last three days of life he was unable to retain anything taken by mouth.

At postmortem the peritoneal cavity contained about 1,000 c.c. of brownish cloudy fluid. The heart weighed 400 grams and showed moderate coronary sclerosis and marked old fibrosis. All the peritoneal surfaces, including the serosa of the bowel, were studded with innumerable small tumor nodules. The omentum was rolled up, thickened and covered with a layer of small nodules of tumor; in places it and the stomach were adherent to the anterior abdominal wall. The parietal peritoneum and the diaphragm were thickened by infiltration of tumor. The various organs on section showed no tumor metastases.

The esophagus showed nothing of note. The pyloric portion of the stomach was markedly thickened by diffuse infiltration of tumor. This infiltration extended into the root of the mesentery and the other structures posterior to the pylorus so that they were fused into a solid mass. There was a posterior gastroenterostomy with the proximal portion of the jejunum, in good condition. The duodenum had been closed off. The mucosa of the stomach was diffusely congested. The wall of the stomach was about 2 cm. thick at the pyloric region; it became gradually thinner toward the cardiac end so that at the cardia it was not appreciably thickened. The mucosa of the small bowel appeared normal.

Microscopic examination: Stomach in pyloric region—diffuse infiltration of carcinoma cells between muscle bundles and in the thickened submucosa and serosa; the picture is that of typical scirrhus carcinoma.

Title: Scirrhus carcinoma of the stomach surviving ten years after gastroenterostomy.

Comment.—In all probability there was a scirrhus carcinoma present in the pyloric region of the stomach at the time of the gastroenterostomy ten years ago. This is an unusually long period of survival and illustrates the fact that gastroenterostomy, even though it may be looked upon as only a palliative measure, is decidedly worth while in these cases of slowly growing carcinoma of the stomach.

VITAMIN D MILK

Because of the practicability of administering vitamin D to infants directly in milk, this fluid fortified with the vitamin, either by the addition of concentrates, by the feeding of irradiated yeast to the cow, or by the direct irradiation of the milk, has received special attention. Clinical experience with the different types of "vitamin D milk" in the prevention and cure of rickets in infants has indicated that, unit for unit, there appears to be no great difference between the antirachitic value of the three types. If a slight difference actually existed, it was thought to be in favor of the milk irradiated directly. A recent experimental investigation on chicks by Haman and Steenbock, however, seems to indicate that in this species a distinct difference exists between the antirachitic activities of "yeast milk" and of "irradiated milk." The results demonstrated that "irradiated milk" is approximately ten times more effective than the same number of rat units of "yeast milk" and, further, that the antirachitic

activity of the former compares favorably with that of cod liver oil and irradiated cholesterol. A distinct difference between the vitamin D content of the cream and that of the skim milk portion of "irradiated milk" and "yeast milk" was also described. The foregoing investigation gives no support to the possibility that the baby chick can be used with greater accuracy than the rat for ascertaining the antirachitic effectiveness of different vitamin D containing substances in infants. However, it is of some interest in this connection that, according to a recent clinical study by Davidson, Merritt and Chipman, the feeding of "yeast milk" to premature infants as the sole source of vitamin D proved to be inadequate for achieving complete protection against rickets. It would seem that the question of the relative merits of various antirachitic agents is far from solved and that there is an urgent need for further carefully conducted and controlled studies of the problem, particularly in full-term and premature infants.—(J. A. M. A., May 9, 1936, p. 1664.)

EDITORIAL

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BUSINESS MANAGER
J. R. BRUCE, Saint Paul

Volume 19 JULY, 1936 Number 7

Is Histidine Treatment for Ulcer Discredited?*

Three years ago, Weiss and Aron of Strasbourg introduced histidine monohydrochloride in the treatment of gastric and duodenal ulcer. Since ulcers could be produced in 95 per cent of dogs by the now familiar Mann-Williamson technic, these authors were of the opinion that the cause of such ulcers was the loss of some vital substance produced in the animal. Owing to the absence of duodenal secretions under the conditions of the experiment, and since some of the amino acids are normally produced in the duodenum by protein cleavage, Weiss and Aron assumed that patients with gastric or duodenal ulcer had a deficiency of amino acid. The assumption naturally followed that an insufficiency of this vital substance in the cells of the gastroenteric walls resulted in erosion and ulceration

by action of the acid chyme. Their investigations on a few dogs with experimentally produced ulcers with regard to the prophylactic and healing properties of certain amino acids led them to conclude that the gastroduodenal mucosa resists the corrosive effects of the gastric juice under the influence of histidine-tryptophan. On further investigation, Aron concluded that histidine "larostidin" alone apparently had a very favorable effect.

In the past two years numerous encouraging reports concerning the histidine treatment of peptic ulcer have appeared in the foreign literature and several more have recently appeared in the American literature. As many physicians as well as patients are receptive to any new method of treatment, especially when it appears to be effective, simple, and entails very few restrictions, much interest was aroused in histidine therapy. This was abetted by the none too restrained campaign of publicity launched by the manufacturers of the proprietary product.

Parenteral treatment of peptic ulcer is by no means an innovation. For the past fifteen years a wide variety of substances, such as vaccines, specific and non-specific proteins, killed and attenuated bacterial organisms, ferments, various salts, endocrine products, solution of lipo-proteins with emetine "synodal," and, very recently, metallic bismuth, have been used. The proponents of these various methods claimed good results, invariably after insufficient periods of observation; sooner or later, however, these various procedures were relegated to obscurity. This historical fact, coupled with more complete knowledge of the life history of ulcer and the factors involved in its pathogenesis, naturally leaves the circumspect physician unconvinced that another rabbit in the magician's hat, in the shape of amino acids, would do the trick.

Recent clinical and experimental observations throw considerable doubt not only on the effectiveness of histidine therapy, but also on the reasoning or conceptions on which such therapy is based. One may conclude from the independent reports of Kirby Martin and of Sandweiss (Jour. Am. Med. Assn., April 25, 1936) that the

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota.

clinical improvement is of a symptomatic and transient nature in nearly all instances. In a paper read at a recent meeting of the American Medical Association, Sandweiss, Salzstine and Glaser stated that injections of distilled water compare favorably with injections of vaccine, larostidin and synodal. Moreover, these investigators were unable to corroborate the original experiments of Weiss and Aron because jejunal ulcers or blood in the stools regularly followed the Mann-Williamson procedure on dogs in spite of adequate daily injections of histidine.

Stalker, of The Mayo Foundation, has recently carried out some experiments on 150 dogs, to determine the prophylactic effect against gastro-duodenal ulceration by cinchophen of various substances, including mucin, duodenal extract, the diet-alkali (Sippy) regimen, milk alone, and larostidin. Briefly, all the controlled dogs developed a chronic cinchophen ulcer within an average of thirty days. Fifty per cent of those treated with mucin developed a typical chronic ulcer. Each dog receiving milk only developed an ulcer but not a severe one. Every dog treated with larostidin developed a chronic ulcer. Stalker was not able to produce a single chronic lesion in any of the dogs treated by the diet-alkali method. A few small, acute lesions were observed. These experimental observations appear significant, and in the main support clinical experience.

The Council on Pharmacy and Chemistry of the American Medical Association properly declared larostidin unacceptable for New and Non-official Remedies because it is marketed with unwarranted therapeutic claims. The Council voted to postpone further consideration of the preparation until adequate clinical evidence of its therapeutic usefulness is available.

GEORGE B. EUSTERMAN.

Memorial Service for Dr. Millard

On Sunday afternoon, June 7, representatives of various medical organizations assembled at the Fairview Cemetery in Stillwater, for the dedication of a tombstone to Dr. Perry H. Millard, first dean of the Medical School of the University of Minnesota.

The ceremony as announced in our May number was carried out as planned, and advantage was taken of the occasion by the various speak-

ers for eulogizing Dr. Millard for his foresight and determination in laying the foundation of the Medical Department of the University. It was Dr. Millard, a practicing physician in Stillwater, who realized the 'chaotic condition of medical education and practice in Minnesota in the eighties, and was statesman and politician enough to induce the legislature to make provision for a medical department at the University. He also early realized the importance of pre-medical education, the importance of the medical laboratory and early bedside training for the medical student.

Dr. Adam H. Smith, president of the Medical Alumni Association, introduced the speakers. Mr. Andrew Holm, representing the Board of Education of the City of Stillwater, and a former acquaintance of Dr. Millard, gave those in attendance some idea of the personality of Dr. Millard. Dr. H. S. Diehl, present Dean of Medical Sciences at the University, emphasized the importance of carrying on the work initiated by Dr. Millard, and Dr. Louis B. Wilson, who entered the medical school in 1889 and worked under and with Dr. Millard, paid tribute to the first Dean's grasp of the important phases of medical education. Dr. E. P. Lyon, who retires this year as Dean of the Medical School, gave credit to Dr. Millard's ability in impressing the legislature with the necessity of a state-supported medical school. Dr. Guy Stanton Ford, Dean of the Graduate School, spoke for the University in place of President Coffman. Dr. William F. Braasch, as a medical alumnus, mentioned some of the outstanding medical graduates of the medical school begun by Dr. Millard, and Dr. W. W. Will, president of the Minnesota Medical Association, and Dr. C. B. Wright, trustee of the American Medical Association, added their tributes from their respective organizations. Dr. J. T. Christison, in the final address, spoke as a former acquaintance of Dr. Millard and paid tribute not only to Dr. Millard but the group of pioneer medical men who under his leadership helped to launch a medical school of which the state may be proud.

It was Dr. Boleyn of Stillwater who called the attention of Minnesota Medical Alumni to the unmarked grave of this outstanding pioneer in medical education in the state. Although Dr. Millard's name will be handed down to posterity in connection with Millard Hall at the

University, and the mature medical school of today is an actual though silent witness to the foresight and energy of Dr. Millard, the correction of the oversight of his grave seemed necessary to the alumni and was fittingly remedied.

Testimonial Dinner

A testimonial dinner in honor of the retiring members of the faculty of the Medical School of the University was held at the Minnesota Union on the evening of June 10, 1936.

President Lotus D. Coffman presided and later presented Dean Lyon. Dr. Jennings C. Litzenberg was the toastmaster.

The retiring members were: James T. Christison, Charles A. Erdmann, James S. Gilfillan, Thomas B. Hartzell, Charles H. Mayo, John T. Rogers, John L. Rothrock, Franklin R. Wright, Elias P. Lyon.

The honored guests were presented by the heads of their respective departments, Dr. C. M. Jackson, Dr. J. C. Litzenberg, Dr. O. H. Wangenstein, and by Dr. S. Marx White, and Dr. F. C. Rodda in the absence from the city of Dr. J. C. McKinley and Dr. Irvine McQuarrie. The retiring members responded with vitally interesting reminiscences and anecdotes of the early days of medicine in the state and at the University.

Dr. Adam M. Smith, president of the Medical Alumni Association, announced the establishment of the Elias Potter Lyon Lectureship in honor of the retiring dean.

Dean Harold S. Diehl presented as a gift from the heads of the departments of the Medical School to the University an excellent portrait of Dean Lyon. Dr. Diehl's survey of the development of the medical school was a worthy tribute to the faithful service of Dean Lyon. His period of administration from 1913 to 1936 covered twenty-three of the forty-eight years of the existence of the medical school. In this period, the medical school achieved high standards and, with the Mayo Foundation, also leadership in graduate training and research.

Dr. W. J. Mayo accepted the portrait for the Board of Regents of the University and expressed their thanks and appreciation. Dean Lyon's response indicated that retirement would not still the interest with which he and others would watch future medical progress.

This recognition of the retiring members of the medical faculty emphasizes that the high plane of medicine in Minnesota was not attained through chance, but was built in a considerable measure by the vision and faithful service of members of the faculty. Its leadership, its rank and file, including full-time men and practicing physicians, all contributed their part to make the standards of Minnesota medicine high.

EDUCATION GUIDES THE YOUNG TO GOOD CITIZENSHIP*

WILLIAM J. MAYO, M.D.

Rochester, Minnesota

IN no other country in the world does just such a gathering as this occur, where the students of people from the entire range of our society come together on a basis of equality and are sent off on that basis to render the highest known service.

The outstanding feature of American public life today is reverence for education. The cost of education borne by the American people is greater than any other expense supported by the people, and this burden is borne willingly, with the expectation that finer citizenship will be the result, and with the hope that the democratic form of government, to maintain which the nation has offered life and wealth in four great wars, shall be made safe and dependable in the years to come.

As one travels through the United States one is impressed by the splendid school buildings seen in all sections. In nearly every village, no matter how remote or how poor, will be a structure, the school building, which is magnificent compared with its surroundings, a source of pride to the inhabitants, and regarded by them as a hostage for the future. The school house is the proud monument to the desire of the people that their children shall receive a better education than they themselves had. It is a visible testimonial of their loyalty to the country in which they live, and of their resolute determination that its future shall be made secure, not by efforts of arms but by efforts of intellect. Apparently there is an unconscious feeling that if we are to have the government we desire, and prosperity for all, it must come from education.

Value of Youthful Viewpoint

There is a divine discontent with the existing order of things which leads to progress. Youth is ever insurgent, dissatisfied with conditions as they exist, and this state of mind is necessary to progress. Youth has visions of the future which are not shared to an equal extent by those of middle and later age; youth is a

*Commencement address, Notre Dame University, Notre Dame, Indiana, June 7, 1936.

builder of images, a dreamer of dreams. When guided by scientific imagination, youth builds images to be compared with known facts, and dreams true dreams.

We of the older generation admit freely that our viewpoint has been greatly influenced by the misfortunes through which we have passed. We believe too often, as our elders believed, when we were young, that youth is headstrong, unruly, without due reverence for the established order of things.

The older generation is always uncertain about the younger generation. In the earlier time young people were kept innocent, perhaps ignorant, with the expectation that innocence would be a protection to their morals and ethics. The young people are more sophisticated today, and perhaps because they know more of evil they will be better protected from it than they would had the so-called innocence of last generations been maintained.

The old should remember that they represent the past, and that the young represent the future. For the best results, the wisdom of age must travel with the dreams of youth. Age carries mental scars left by experience which shorten vision, but age carries wisdom. Youth and age should travel together; each needs the other for orderly scientific advancement. Age, if it has gained something which is personal to the individual so that he has something to lose, will probably be conservative and will fear new experiences. Imagination is the gift of youth. In my hospital ward rounds I am always surrounded by the younger men; I give them from my experience, and they give me their fresh viewpoint.

Present Day Educational Tendencies

A smart column writer recently said that culture is what a person has left when he has forgotten what he learned in college. After I had had my laugh, I began to wonder whether there was not a good deal of truth in this definition of culture, for, after all, college education is supposed to teach us how to think as well as what to think. It is supposed to develop the power of reasoning and observation, to fire the imagination. To repeat what we have memorized, of itself, is not more in effect than is done by a phonograph record, and perhaps is just about as informative.

I sometimes question whether the present tendency to depend so much on memorizing knowledge gives a sound basis of education for the future. Knowledge is static; wisdom is active and moves knowledge, making it effective. As I think back on my own classmates in college, I am impressed with the fact that many of them who had fine memories and stood at the heads of their classes, in some way in the after years missed acquiring wisdom and did not come up to our expectations. Some students can fill their minds with any given subject, book, chapter, and page, and can regurgitate this knowledge at examination and thereby win class leadership. Such memorizing of knowledge has not necessarily relation to wisdom. After all, the best the college can do is to give the students breadth of knowledge, not necessarily depth of knowledge.

As I look on the present day tendencies in higher education, I notice a remarkable difference from conditions as they existed when I was a college student. The valuation of culture for its own sake was then in the ascendancy, and our eyes were fastened almost wholly on the past. And yet, knowledge of the past gave the foundation upon which has been built the present, and upon which we predict the future.

Personally I have not been in sympathy with the view that, because there are already so many well-trained men, something must be done to prevent younger men from entering our professional schools. It certainly is a sad commentary on our times if we introduce unnecessary obstructions and obstacles to prevent students from entering the professions or to trap unwary students, so that they may be prevented from continuing their studies after their course is started, unless such procedures result in turning out better men and are not merely evidence of an unconscious trade-union state of mind which tends to make a profession an aristocracy.

Let us not get the idea that there are too many doctors, too many lawyers, architects, engineers, nurses, grocers, coal-miners, and what not. As a matter of fact, it would appear that there are too many of all of us, yet that assumption of itself refutes the argument that we must reduce the number in each class. It is almost a paradox that when we have too much of everything collectively, we worry most because we have too little individually.

The history of a growing civilization teaches the wisdom, in fact the necessity, in developing a community life, of loving one's neighbor as oneself. This precept is not only biblically and historically true, but the peace of the world depends upon it. As we become more civilized we are beginning to emphasize not the differences that lead to antagonism but the common impulses and desires which lead to better understanding.

Today is commencement day for you, and it means just what it says, not the end of education but the beginning of education which comes from living with our fellow men. General adult education progresses through books, newspapers, and, to some extent, perhaps, through the radio and even the movies, but it is a different kind of education from that begun in the schools and colleges. Good roads and automobiles have enabled us to become better acquainted with different sections of the country, and if we are observing, we begin to get the idea, after all, of the solidarity of the American people.

What holds us together fundamentally is respect and affection for our country. We love the American flag because it symbolizes that we are joined together for certain definite life purposes. Let us not be discouraged by the fact that some of those among us, and especially young people, profess to scorn the Stars and Stripes and thereby refuse, by implication at least, to do their share in maintaining the welfare of all of us. So many who are discontented with their lot and condition believe that by criticism they are testifying to their natural desire for betterment. What they really are testi-

fyng to is that for the time being they are not content to share the collective responsibility of the people as a whole.

The large majority of the citizens of the United States are reasonably intelligent and, as far as their knowledge goes, are reasonably fair-minded. Let us admit that we are governed by the average man doing the best he can to adjust governmental procedures to do justice to all, but subjected to all sorts and kinds of propaganda. Many of the proponents of the various schemes and projects to cure our political ills, because they cannot marshal facts to appeal to the intelligence, must therefore, to gain a hearing, appeal to the emotions, which are only too easily aroused by prejudice, invective, and misleading statements. As a matter of fact, it appears at the present day to be quite the thing for some of the intellectual high-hats to try to prove that all the beliefs and institutions we hold dear are delusions. The so-called intelligentsia have been most vociferous in this direction; as an intelligent observer defined them: they are people who have been "educated beyond their intelligence."

It is easy to philosophize; the philosopher is said to be one who bears with equanimity the sufferings of others.

Dr. Morris Fishbein, in discussing the present social, political and economic trend, told the story of the philosopher and the psychologist. The philosopher, a blind man, in the middle of a dark night goes down into an unlighted cellar and hunts for a black cat that is not there; the psychologist is a blind man who, under the same conditions, makes the same search but finds the cat.

It is easy for all to recognize that a change is coming in the social condition of the people of the United States which in a way is comparable to the change that is taking place in older countries through the elimination of hereditary royalty and nobility. Fortunately it does not take the average American citizen long to recognize that radical change from a government "of the people, by the people, and for the people" which permits of free debate and expression of opinion would be disastrous. As a people, we realize how much better we are situated than are those peoples under the governments of communism, nazi-ism, or fascism, which promptly become tyrannical in order to enforce, through fear, the viewpoint of an organized minority which eliminates debate, free thinking, and other fruits of education. But we must ever recognize that the majority of our people must have so satisfactory a social condition that they will not become so desperate as to be misled by pernicious propaganda of this description.

One thing we all can agree upon is the value of education and faith that education will enable the young who are to take our places to solve their problems as we of the older generations solved ours. Out of this composite education we finally accept the idea that man does not live for himself alone but as an integral part of society.

As one reviews the history of man, noting the changes that are manifest in his increasing perception

of cultural things, the imagination always developing on the basis of the facts as they appear, it is obvious that the study of biology has been largely neglected by many of our institutions of learning. It is of great interest to know that Notre Dame accords a place to biology, as witnessed by the new building and increased equipment which are projected for the study of this fundamental science.

My father lived in the time of the pioneer. My brother and I have lived through the time of the development of a great country: wasteful, profligate, yes, but still a great country. Today the people at large are pinning their hopes of the future on the Stars and Stripes, the flag of education.

And let me say that these remarks have been made as a prelude to the corollary that education does pay.

Diatone: An Alleged Insulin Substitute

According to the advertising literature in the files of the Council on Pharmacy and Chemistry, Diatone is claimed to contain in each 5 grain tablet "1 grain of colloidal uranium, together with whole pancreatic substance (which is employed simply as an intestinal digestant and not as a hormone substitute) together with other [sic] excipients." It is proposed by the firm for oral administration in the treatment of diabetes. As yet there is no preparation for oral use that can adequately substitute for insulin in the therapy of diabetes. Diatone, if it contains the amount of uranium that the firm claims it does, must be classed as a dangerous preparation. While the exact nature of the uranium in Diatone is not clear, even if this is in the form of the metal or of one of the relatively insoluble uranium compounds, such as the oxide, enough uranium may nevertheless be absorbed, through the solvent action of the hydrochloric acid of the gastric juice, to produce serious systemic poisoning.—(J. A. M. A., May 30, 1936, p. 1939.)

FATAL ASPHYXIA IN A CASE OF RETROPHARYNGEAL ABSCESS

(Continued from Page 462)

factors beforehand, or of anticipating the fact that the mere introduction of a tongue depressor would have such fatal results. If it could have been foreseen, the only alternative would have been to do a preliminary tracheotomy, or enter the abscess by way of a pharyngotomy. However, unless definite indications warranted, one would hesitate to employ such drastic measures for a condition which usually can be treated by a single incision, without permanent deformity.

Conclusions.—A retropharyngeal abscess should always be considered a serious condition. The symptoms encountered in such cases may not give us a true picture of the advanced stage of the laryngeal and esophageal obstruction and the resulting oxygen deficiency. Any intraoral manipulations may bring about complete laryngeal obstruction and so cause irreparable damage in the form of asphyxia. Early diagnosis of the condition is the only safeguard against such disastrous results.

Reference

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MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.
L. H. Rutledge, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.
A. N. Collins, M. D.

Your Standing Orders

1. To keep in constant and intimate touch with all local county boards concerned with welfare work with a view to—

Making proper arrangements for care of the sick poor.

Making whatever local arrangements are necessary for medical, hospital and nursing care allowed by law to old age pensioners.

2. To make the acquaintance of your Senator and Representatives and to keep in touch with them with a view to—

Keeping them informed about medical problems involved in the care of the sick poor and the aged.

Keeping them informed concerning the importance to the public welfare of protecting our Basic Science Law against attacks from cultists and irregulars.

Keeping them informed of the attitude of the practicing profession toward any form of socialization of medicine that endangers the doctor-patient relationship; the freedom of the physician from lay interference; the freedom of the patient to choose his own physician.

The above are needed all the year round. It is not sufficient to make them a county society project for one month or two months.

That is the reason why we have set them off in a place of prominence and called them "Standing Orders" this month.

If unwise and improper regulations with regard to the care of the indigent and relief generally are allowed to persist—if improper and evil legislation is passed, it will be because somewhere physicians are failing in these two obligations.

Read them each month at your county society meetings and check up to see if, in fact, they are being carried out. Your professional welfare as well as the public interest is at stake.

Kansas City Meeting

Many matters of grave importance to American medicine and to the American public received attention and action by the House of Delegates at the Kansas City meeting of the American Medical Association.

With characteristic clear-sightedness and balance, the association continued to keep clear of doubtful social experimentation and questionable propaganda.

Its wisdom and common sense were demonstrated in many directions during the conclave.

Public Welfare

Among various actions of the delegates relating directly to the public interest was a long series of resolutions. Among these the following are of especial interest:

A committee is to be appointed to study and report upon the problem of motor accidents and injuries.

A study and report is to be made upon prevention of deaths from asphyxia.

Methods of air-conditioning are also to be studied and reported upon.

The delegates went on record as opposed to irresponsible promotion and marketing of mechanical aids to the detection of deafness.

They registered their disapproval, also, to the sale, without prescription, of such dangerous drugs as canabis, the barbituric compounds and denitrophenal.

The delegates likewise accepted the following interesting report upon the reliability of blood tests to determine paternity which may have considerable effect upon future legal maneuvers and prevent some long drawn out and futile litigation.

tion: "It is not possible," says the committee, "to state with any degree of certainty that the child is offspring of a certain adult or that the latter is the father or mother of the child on the basis of any examination of the blood."

Medical Standards

Of special interest to practicing physicians as bearing directly upon medical organization and maintenance of high standards of medical training and practice were the following recommended by the Council on Medical Education and Hospitals:

1. That physicians on the staffs of hospitals approved for intern training be limited to members in good standing of their local county medical societies.

2. That the teaching of medical economics in the medical colleges is of the first importance and that the necessity for development by the deans of the medical faculties of competent teachers in this branch should be stressed.

3. That careful study should be made of proper methods for improving entrance requirements as to character and fitness of students entering upon medical courses in educational institutions.

Radiology

The House also adopted the recommendation of the Council and Reference Committee that the following principle, first enunciated by the House in 1934, be reiterated: "That the practice of radiology, whether for diagnostic or therapeutic purposes, constitutes, in fact, the practice of medicine." It further recommended that all services connected with the practice of radiology be under direct control and supervision of the medical profession and that this same principle apply to all other technical and professional services.

From the Bureau of Legal Medicine

Of great moment to the physicians were the recommendations and comments made by the Bureau of Legal Medicine and Legislation, all of which were approved by the delegates.

The bureau recommended, and the Reference Committee endorsed, the coöperation in good faith of the medical profession in carrying out the provisions of the Social Security Act, having the following point particularly in mind:

Social Security: Local Problem

That the basic requirements of the federal legislation are so broad as to permit the creation within the state social legislative structure of conditions which may be very difficult of administration in a manner acceptable to physicians if the local profession does not participate in the organization of the state structure.

Miscellaneous

Attention was called by the Bureau, also, to the fact that while, in many states, emergency relief officers and supervisors of the poor have declined to assume responsibility for medical relief to individuals employed on WPA, there has recently been a tendency to relax the restriction and recognize the responsibility to provide medical service at public expense for those not receiving a sufficient government wage to provide for themselves.

* * *

No enlargement of the privileges of veterans with respect to medical or hospital care is being pressed by either the American Legion or the Veterans' Administration, according to reports cited by the Bureau.

* * *

With reference to current and pending investigations of silicosis and other occupational diseases, the Bureau and committee went on record as opposed to the creation of any non-medical agencies for study or control of industrial health conditions. These medical functions should be performed by medical men under medical supervision.

* * *

Legislation concerning the reporting by physicians of gun shot wounds should be opposed unless the same requirements are to be imposed upon every other person having knowledge of the wound and the possible conditions under which it was inflicted.

* * *

In this connection, at the recommendation of the Bureau, the House went on record as condemning the practice of performing operations designed to alter appearance with the object of concealing the identity of the individual.

No Compulsory Health Insurance

The Bureau called especial attention to the fact that no legislation establishing systems of compulsory state health insurance have been enacted in any of the states. With the approval of the House, it went on record as regarding as inexpedient the establishment of a United States Department of Health with a cabinet officer at its head.

Medical Economics

Two important studies were reported as underway by the Bureau of Medical Economics. The one on "Group Hospitalization," though still incomplete, suggested much reason for caution so far as plans for this type of hospitalization are concerned.

Says this provisional report of the Bureau: "Returns to date suggest that the importance of group hospitalization plans has been overestimated when measured by the actual number of plans in operation and the number of members enrolled."

The suggestion is made that if these various plans were forced to comply with the principles of insurance laws in the respective states a desirable measure would be provided for the safety of the insured and protection against an unfavorable reflection upon physicians who, in some instances, are actively favoring the establishment of unsound or insufficiently tried plans.

The other report, which will be awaited with interest, concerns the relation between medical ethics and medical economics with a view to clearing up misunderstandings on both accounts.

Legislative Committee

Among the activities reviewed by the Legislative Committee worthy of special note here was the association of Drs. R. L. Sensenich and F. S. Crockett with the women's section of the American Farm Bureau Federation which prevented that body from adoption of a policy in favor of social insurance for sickness.

This association brought to a focus the problem of medical service in rural communities which is admittedly difficult in many localities where the cost of transportation from great distances must be added to the bill that the farmer must pay for medical service.

A study of the actual situation all over the United States was undertaken, as a consequence,

under the auspices of the Bureau of Medical Economics. Partial results of this study do not show an acute problem in many sections. Nevertheless, the committee is of the opinion that the subject of fees based upon mileage requires further study on the part of each state and county society, looking to a possible readjustment to relieve the profession as a whole from the implication of unfair charges in the rural districts.

Washington Conferences

The committee, in a series of conferences in Washington, found great interest displayed by the American Legion and the Veterans' Administration in maintaining high standards of practice in the Administration facilities and in utilization of the material afforded there for investigation and research:

The committee found, also:

That there is much interest in high quarters in Washington in the passage of a really effective Food and Drugs Act (recent communications from Dr. W. C. Woodward of the Bureau of Legal Medicine and Legislation indicate that the currently proposed act is not effective and, if passed as it now stands, will work more harm than good).

That an appalling number of physicians convicted of the illegal use of narcotics are allowed by licensing boards to continue in practice:

That the medical officials of the Children's Bureau, the Maternal and Child Health Service and the Services for Crippled Children give every evidence of a sympathetic point of view toward the medical profession in the administration of Social Security activities; but that, if state medical societies show no interest or are unable to secure satisfactory state organization for administration of the act, Bureau representatives in Washington will be unable to solve the local problem.

Opposed to "Company Doctors"

That American Federation of Labor leaders are opposed to sickness insurance, being especially opposed to "contract doctors," "company doctors," "political doctors."

That the committee instructed to consider the possible reorganization and coördination of the executive agencies of the government in the interests of efficiency and economy is not likely, in view of the tremendous cost of sickness insur-

ance, to find a place for such government insurance in their plans.

State Licensure

The serious matter brought up by the Legislative Committee of the failure of licensing boards to discipline physicians reported by the United States Commissioner of Narcotics was taken up in Executive Session by the House of Delegates. The recommendation was made that the state societies take the matter up with their own state licensing boards.

It was the belief of the special committee which reported at this session that matters of licensure and discipline are state problems and should be kept strictly within the jurisdiction of the states.

The warning was issued that failure to handle the problem satisfactorily is likely to result in federal legislation on the subject.

Excluding Felons

In this connection it is of interest to note that an amendment to the By-laws of the Constitution was offered and passed to make the first sentence of Chapter XI, Section 1, read as follows: "Membership in this Association shall continue only so long as the individual is a member of a component society of the constituent association through which he holds membership and is not now serving or within twelve months has not served a sentence for a felony."

The By-laws were also amended to give the Judicial Council of the American Medical Association power to investigate and discipline in instances of unethical conduct of members when, in its judgment, the instances are of greater than local concern. This important amendment reads in part as follows: "... That the Judicial Council shall have the power ... to request the President to appoint investigating juries to which it may refer complaints or evidence of unethical conduct which, in its judgment, are of greater than local concern. Such investigating juries, if probable cause for action shall be shown, shall report with formal charges to the President who shall appoint a prosecutor who, in the name of and in behalf of the American Medical Association, shall prosecute charges against the accused before the Council. The Council shall have power to acquit, admonish, or expel the accused."

Contraceptives

The Committee to Study Contraceptive Practices, appointed a year ago, reported as follows to the Executive Session:

That there is good evidence to show that a constantly decreasing fertility is not off-set, as the propagandists insist, by the decreasing mortality. That there is little scientific evidence to justify limitation of conception either for eugenic reasons or for the establishment of a better social and economic equilibrium. That, while voluntary limitation of conception may be necessary to safeguard health in some cases, there is no evidence to show that any existing laws interfere with any medical advice on this score that the physician may deem necessary for his patients. That, on the other hand, no type of contraception is reasonably adequate and effective for a large portion of the population. That the only 100 per cent safe and effective method of limitation of births is by continence and that continence practiced by married couples during an assumed fertile period of the month carries with it no moral objections.

The recommendations of the committee adopted by the House were:

1. That a committee be appointed to continue this study and report to the House of Delegates.
2. That the disapproval of the committee be recorded against propaganda directed to the public by lay bodies organized solely for the purpose of disseminating (without consideration or restraint) contraceptive information. The committee deplored the support of such agencies by members of the medical profession. It felt that an entirely false sense of values with respect to the important function of childbearing and parenthood has been created by the activities of such organizations.

Medical School Policies—and the Alumni

From a talk delivered by Dr. W. F. Braasch, Rochester, at the dedication ceremonies held at Fairview cemetery, Stillwater, for the monument recently erected at the grave of Dr. Perry H. Millard, first dean of the University of Minnesota medical school, by the Minnesota State Medical Association and the Medical Alumni of the University.

"The alumni of the University Medical School

have always maintained a sincere and loyal regard for their Alma Mater. They have rejoiced in its progress and are proud of the high standing it maintains among the leading medical schools of the country. They have always taken a keen interest in the various policies adopted by the University in the course of its development. They may not always have been in agreement and, in fact, occasionally they have been frankly antagonistic, unwisely so at times as subsequent experience has shown, but always sincere in the belief that they acted for the best interests of the University. They fully appreciate the attempts made by the University, and those which it is planning to make, in the highly important function of keeping its graduates in touch with the rapid advances of modern medicine.

Alumni Opinion

"We alumni fully believe that the University is intensely interested in our welfare and that it is eager to give us every possible assistance in furthering our work. It is in fact inconceivable that our Alma Mater would deliberately injure its offspring. We do not believe that the University would in any way assume the rôle of competitor, or that it would adopt an attitude which is not in harmony with methods of medical practice endorsed by organized medicine and which from long experience have proved to be in the best interests of public welfare. While in no way wishing to dictate to the governors of university policies, it would seem that alumni opinion should deserve respectful consideration in the final adoption of such policies which affect the medical profession.

Keep Accurate Records says the Medico-Legal Advisory Committee

That the majority of malpractice suits are preventable is agreed by all. That professional jealousies, lack of tact, and vague insinuations cause 98 per cent of these suits which might be more successfully defended if adequate and accurate records were kept, no one denies.

The busy doctor often loses sight of the protection afforded by detailed office or hospital records and is brought forcefully to a realization of their necessity when called into court to testify not only in civil or criminal litigation but to de-

fend a suit involving his professional conduct of a case.

A meticulous jotting down of happenings in a history from day to day is burdensome, but when one is filled with sufficient facts with which to refresh his memory then the chagrin of a lack of good details which discloses slovenly practice to the public and jury is avoided. Of course, one should always avoid any appearance of subsequent tampering. Records should never, under any circumstances, be rewritten or effaced.

To the patient his case is the only one of the kind. Every word the doctor says to him is held in his memory to be brought out at the opportune time. Good records are the store house of the words and acts of the doctor and they should be kept accurately. They are the manifestations in writing of confidences exchanged and should be held so at all times.

From the Hypocratic oath one learns "Whatever in connection with my professional practice, or not in connection with it, I may see or hear, I will not divulge, holding that all such things should be kept secret," but neither this nor the privilege statute applies to the testimony of the attending physician when he is sued for malpractice since he would be wholly without any defense if they did. He must rely almost entirely on his memory to defeat his accuser if complete records are not available to him.

Hearsay evidence in court is not allowed, but an account of the case, in the attending doctor's handwriting in ink, dated and signed by him when made, cannot be refuted by anyone.

Knowing that every medical or surgical case treated is a potential suit, the Medico-Legal Advisory Committee of your state association asks each member to "look well to his records."

Hospitalizing the Indigent

The state law governing hospitalization for the indigent in Minnesota has been subject to much misunderstanding, official as well as unofficial.

Many counties appear, in spite of the clearly stated law of 1935 (printed in these columns in full in the June 1935 issue), to be operating upon an erroneous interpretation of the law of 1921.

Delegates at the Rochester meeting discussed the matter at length and reflected considerable uncertainty of the law as it stands today.

The following history and interpretation is supplied at the suggestion of the delegates by

Mr. F. Manley Brist, attorney for the Minnesota State Board of Medical Examiners. It should be read carefully by all physicians who are concerned in any way in the care of the indigent.

Says Mr. Brist:

Original Enactment

"The original so-called University Hospital law was passed at the 1921 session of the legislature, it being Chapter 411 of the Session Laws for 1921. In creating the Minnesota General Hospital the legislature said:

"Said Minnesota General Hospital shall be primarily and principally designed for the care of legal residents of Minnesota who are afflicted with a malady, deformity, or ailment of a nature which can probably be remedied by hospital service and treatment and who are unable, financially, to secure such care or, in case of a minor, whose parent, guardian, trustee or other person having lawful custody of his person, as the case may be, is unable financially to secure such care. The Minnesota General Hospital is hereby designated as a place of treatment for such persons.

"Said hospital shall be utilized for such instruction and for such scientific research as will promote the welfare of the patients committed to its care, and assist in the application of science to the alleviation of human suffering."

"The wording of this section caused some county attorneys to rule that the University Hospital was the *only* hospital at which the indigent could be hospitalized. As a matter of fact, however, in some counties the indigent were being hospitalized locally, the hospitals were being paid and so were the physicians. In other counties the indigent were being taken outside of the state to be hospitalized. All of these things created more misunderstanding and more bad feeling.

Law of 1933: Objectionable Features

"In 1933, Chapter 393 of the Session Laws for that year was enacted. However, this law was limited to counties having a population of not more than 70,000 and not less than 50,000 inhabitants and any county adjoining on such county. There are only two counties in Minnesota within that classification, the counties being Stearns and Ottertail. This law also restricted the hospitalization of the indigent in such counties to a hospital rated Class "A." The law had the further objectionable feature that the County

Board in these counties could enter into a *contract* 'with such hospital to care for, treat and hospitalize the indigent.'

"The law was also objectionable in that the amount to be paid for hospitalization could not exceed the charge then made by the University Hospital in indigent cases. This charge was to be inclusive 'of medical and surgical care and treatment.' This wording resulted in the local hospital at St. Cloud receiving one half the full rate charged at the University Hospital and deprived the medical profession of any compensation for their services. This law did not have the approval of the Minnesota State Medical Association for the reasons that I have pointed out. It is my further opinion that the law was unconstitutional. I do not believe the medical profession can be required by law to furnish free medical services to any one. Private property cannot be taken for public use without just compensation, and I think the doctrine applicable to professional services would be the same. Furthermore, hospitals as such cannot practice medicine as defined by law and consequently the medical profession objects to the County Board making contracts with hospitals for medical and surgical treatment.

Objectionable Features Remedied: 1935

"At the 1935 session of the legislature a bill was introduced, unsolicited by the Medical Association, that had for its purpose the hospitalization of the indigent 'within the county or elsewhere within the state.' This bill was introduced by a number of members of the legislature who claimed that there were 860 cases on the waiting list at the University Hospital, and that it was unfair to the patient and also to the local hospital and local medical profession, to send all surgical cases to the University Hospital. This bill was not introduced at the request of the medical profession. Following its introduction we asked that a number of amendments be made in order to remedy the evils of the 1933 law and to clear up any misunderstanding as to whether or not the Board of County Commissioners could hospitalize the indigent locally if they so desired. This law in no way amends the University Hospital law. It simply gives the Board of County Commissioners the right to decide whether or not they wish to hospitalize them at the University Hospital or within the county, or elsewhere within the state. Considerable complaint has been

made to the State Medical Association that the indigent in Fillmore and Houston Counties are hospitalized at LaCrosse. This situation was corrected insofar as the law is concerned in the 1935 law. In addition the law was changed to read:

"The cost of hospitalization of such indigent persons, exclusive of medical and surgical care and treatment, shall not exceed in amount *the full rates* fixed and charged by the Minnesota general hospital."

"The word 'contract' was also stricken from the 1935 law and the expression that the County Board 'is hereby authorized to provide for the hospitalization' was inserted. The 1933 law, as I have explained, was applicable only to counties with a population of fifty to seventy thousand inhabitants and counties adjoining thereon. The 1935 law was made applicable to the County Board of any county in the state.

"All in all we were of the opinion that the 1935 law is much more fair to the medical profession and the hospitals throughout the state than the 1933 law. No attempt was made to in any way interfere with the wording of the University Hospital law. If the County Board so decides it may send patients to the University Hospital. If it decides otherwise, the patients can be hospitalized locally."

Program for Crippled Children

Social Security funds available under Title Five of the Act in Minnesota are being administered by the Board of Control under the immediate supervision of Dr. H. E. Hilleboe, director of the Tuberculosis Division of the Board of Control.

Approximately \$50,000 is available under this title of the Act for care of crippled children and the money is to be administered by the state agency that is already in charge of the state's program for crippled children.

According to the immediate program outlined by Doctor Hilleboe before the Council and the House of Delegates in Rochester, this money was to be put to use to hospitalize crippled children now on the waiting lists for the Gillette State Hospital for Crippled Children, the Eustis Memorial Hospitals at the University and the Shriners' Hospital. There were about 200 of these children, Doctor Hilleboe reported, some

of whom had been waiting for as long as two and three years.

These children were to be hospitalized in other approved hospitals under care of orthopedists selected in consultation with the Minnesota-Dakota Orthopedists' Club.

Rates of Pay

A standard rate of payment of two dollars for each hospital day for the surgeon and four dollars a day for the hospital with an extra allowance of two dollars a day for x-ray, braces, plasters, casts and other appliances was agreed upon with the orthopedists. The rate was found to be satisfactory to the hospitals on the approved list and hospitalization on these terms is now under way.

In addition, Social Security funds are being used to assist in financing a series of orthopedic clinics in coöperation with the Minnesota Public Health Association and the State Department of Education. These clinics provide opportunities for consultation between local family physicians and the specialists on the home care of crippled children and also a means of discovering those who need hospitalization. The State Department of Education participates to make plans for the education and re-education of cripples wherever it is needed. The health association organizes the clinic and makes all essential lay contacts with parents, local organizations, newspapers.

The employment of several follow-up nurses whose business it will be to keep in touch with children who have been dismissed from the hospital but who need supervision to see that proper procedures are carried out is also contemplated as a means of releasing some children earlier from the hospitals.

Herman Johnson Memorial Fund

Among many interesting letters that are reaching the committee in charge of the Herman Johnson Memorial Fund is this one which shows not only the generosity of the writer but a sense of special obligation that has been noticeable in many other letters from associates of "Herman" whose name, says this writer, is well known to medical men in the state:

"Your circular letter of June 3 is at hand. I am enclosing a check for \$10.00 as my contribution to this fund with the understanding that I am willing to contribute to the extent of

\$100 provided the \$2,000 limit is not subscribed. I believe that this is a fund that should be made up of small contributions from practically the entire profession. I do not wish to criticize your methods, nevertheless, I think if you had sent communications to each member of the profession asking them outright to send two dollars and not equivocate in any way that you would have succeeded in getting the money very promptly. . . ."

At the time this issue went to press the fund had reached \$1,129.75, a little more than half the amount required to establish the Herman M. Johnson Lectureship on a sound permanent basis. Contributions should be sent to state headquarters, 11 West Summit, St. Paul, Minnesota.

Health Survey

Requests for medical confirmation of diagnoses secured by enumerators for the Health Survey of the United States Public Health Service are now going out to physicians in Minnesota. They are going only in cases where consent has been secured from the persons interviewed, according to Mr. Russell H. Ewert, St. Paul, acting state supervisor for the Health Survey in Minnesota.

A part of an opinion by Attorney General Harry H. Peterson on the legality of the procedure, recently secured for Mr. Ewert, is quoted herewith:

"... We do not believe there is anything illegal in the procedure . . . if all the information obtained is given voluntarily and with the consent of the individual concerned, where such information is used for statistical purposes only in the manner you have asserted it will be used.

"We may, however, suggest that, as an additional precautionary measure, it might be advisable in each case to have the written consent of the person concerned before the physician treating such person is questioned by the United States Public Health Service."

In the Same Boat

There is an interesting parallel between some of the difficulties in which private business finds itself these days and the problems of the medical profession.

Business is looking with alarm upon the co-operatives which have revived of late and are

said to have done a \$500,000,000 volume of business in the United States in the last year.

These new coöperatives are using modern competitive methods of advertising and organization. Along with other so-called non-profit organizations, they are exempted from the income tax and they are naturally viewed with dismay by private business according to Eugene Whitmore writing on "Tempest in the Co-op Teapot" in the June issue of *American Business*.

Mr. Filene Again

Furthermore, the same Edward A. Filene who has interested himself in sickness insurance for America has announced recently that he is providing \$1,000,000 in cash for organization expenses incident to the promotion of a national group of consumer coöperative department stores.

The American medical profession is now beginning to be confronted with a situation in which the glittering promises of the consumers' coöperatives may be extended to medical care.

To be sure, the parallel between business and the delivery of medical care cannot be carried beyond a definite point. After that, it falls down quickly. The method of delivery for oil or tires, for instance, does not necessarily affect the quality of the oil or tires themselves. If one system of distribution is able to deliver the same articles cheaper in the long run than another, then there is no loss to the consuming public.

But medical service is not like oil or tires and a very inferior service reaches the consuming public under the coöperative or socialized system of delivery for medical care. Furthermore, its purveyors, reduced to clerks, are transformed into a politically controlled profession of time servers.

Minnesota State Board of Medical Examiners

Polk County "Naturopathic Physician" Sentenced by Court

Re: State of Minnesota vs. Luross

Knute H. Luross who holds no license to practice any form of healing in the State of Minnesota was sen-

tenced on June 16, 1936, to a term of six months in the Polk County Jail by the Honorable James E. Montague, Judge of the District Court at Crookston, Minn. Luross was convicted by a jury in the District Court of Polk County on March 12, 1936, on an information charging him with practicing healing without a basic science certificate.

For several years the above defendant had maintained an office at Fosston, Minnesota, where he represented himself to the public as a chiropractor and as a naturopathic physician, notwithstanding the fact that he had no license. Following the conviction of the defendant in March, Judge Montague granted a stay of thirty days to give the defendant an opportunity to appeal the case to the Supreme Court in Minnesota. However, no appeal was taken.

When the defendant was called before the Court for sentence, Mr. W. E. Rowe of Crookston, who appeared for the defendant, objected to any statement being made to the Court by Mr. Brist on behalf of the Minnesota State Board of Medical Examiners. Instead of discussing the merits of the case Mr. Rowe complained about the defendant being persecuted, and admitted that he did not even know whether or not Luross had been carrying on his practice since his conviction. Mr. Rowe further stated that a suit would be brought against the Basic Science Board on behalf of Luross to obtain a basic science certificate for him without examination. Judge Montague permitted Mr. Brist to make a statement concerning the case on behalf of the Minnesota State Board of Medical Examiners. It was pointed out to the Court that Luross was first arrested in 1931; that for more than five years he has practiced healing in defiance of the laws of this State. The Court was also informed that in 1931 Luross was going to institute a suit against Basic Science Board to obtain a certificate of registration without examination, but no suit was instituted by Luross. One was instituted, however, on behalf of W. W. Shenk. The Shenk case was decided against the naturopaths in the District Court of Hennepin County and in the Supreme Court of Minnesota.

At the conclusion of the proceedings Judge Montague placed the defendant on probation for the period of one year. Luross is to absolutely refrain from practicing healing in any manner unless licensed. Judge Montague also informed Luross that if he violates the conditions of the suspension the sentence will be put into effect.

The State Board of Medical Examiners wishes to make its position clear in this matter by stating that every opportunity has been given Luross in the past five years to comply with the laws of the State of Minnesota, but he has not done so and he will not be permitted to practice in this state unless properly licensed. In the event he attempts to do so the Minnesota State Board of Medical Examiners will take the steps that are necessary not only to put a stop to it but to see that the defendant is punished for doing so.

Unlicensed Rupture "Expert" Stopped at Moorhead

One J. E. Squire, forty-two years of age, claiming to represent the Wm. S. Rice Company of Adams, New York, was ordered to refrain from practicing healing at Moorhead, Minnesota, on May 15, 1936. An advertisement had appeared in the local paper reading as follows:

COMING TO END RUPTURE TROUBLES

Representatives of Wm. S. Rice, Adams, N. Y., originator of the Rice Method for the self treatment of rupture at home, will be at the Comstock Hotel, Moorhead, Minn., afternoon and evening of Friday, May 15, to give a personal and free trial of his method to all sufferers who want to end rupture trouble and truss wearing.

No matter how bad the rupture, how long you have had it, or how hard to hold; no matter how many kinds of trusses you have worn, let nothing prevent you from getting this FREE TRIAL. Whether you are tall and thin, short and stout, have a large abdomen, whether you think you are past help or have a rupture as large as your fists, this marvelous Method will so control and keep it up inside as to surprise you. It will so restore the parts where the rupture comes through that soon you will be as free to work at any occupation as though you have never been ruptured.

The trial will be absolutely complete and thorough without a penny of cost.

You owe it to your own personal comfort and safety not to miss the great free demonstration. It is a real opportunity to learn how you may be done with chafing trusses and the danger, suffering and trouble your rupture has caused.

The hours are 1 to 5 p. m. and evenings 6 to 9. Remember the dates and place. Comstock Hotel, Moorhead, Minn.

At the office of Mr. James A. Garrity, County Attorney of Clay County, the law was explained to Mr. Squire, and he was informed that he could not examine patients, fit trusses, nor treat rupture in the State of Minnesota unless licensed. He stated that the charge for this device was from \$8.00 to \$15.00 and that Moorhead was his first stop in Minnesota. He also planned to stop at Fergus Falls, but stated that he would prefer to leave the State of Minnesota at once. No prosecution was instituted. Mr. Squire had seen no patients and under the circumstances he was given an opportunity to leave and did so at once.

OBITUARY

Ragnvald Leland
1865-1936

RAGNVALD Leland was born at Borge Lofoten, Norway, on August 19, 1865. His parents were Johan J. Liland and Johanne Volla. His education for higher scholastic degrees was completed at Oslo in 1888, and in the same year he left for the United States, eventually settling in Minneapolis. Here he took up the study of medicine at the University of Minnesota.

Graduating with the degree of Doctor of Medicine in 1895, he practiced at Menomonie and Grantsburg, Wis., for about a year, and then moved to Kenyon, Minnesota, where he practiced until the day of his death, April 28, 1936.

On June 23, 1897, he was married to Mabel Johnson at West Salem, Wisconsin. To this union were born five children: Dr. Harold R. Leland of Minneapolis; Valborg Von Kuegelgen of Winnipeg, Canada; Hildur of Wesleyan University, Bloomington, Illinois; and Marna and Margaret of Minneapolis; all of whom, together with his wife, survive him. He is also survived by a brother, Gotfred, who lives at Birch Hills, Canada, and by two younger sisters, Selma, the wife of Hans Rystad, and Dina, now Mrs. Laurits Eggum, both of Bergen, Norway.

Dr. Leland was a man of general culture, widely read and versed in many subjects. He had two interesting hobbies in music and languages, besides keeping well abreast with the exacting demands of his profession. He was a man of unusual intellectual attainments, and as a student of language was unusually proficient.

In spite of his attainments and success in his profession, Dr. Leland was very modest, shunning all ostentatiousness and personal display, and choosing rather to be faithful in the performance of his duty to his patients, his family and his fellow men than to be known for any other accomplishments. He was a good father and a loving husband, and enjoyed the quiet and companionship of his friends and family circle more than anything else. He was always in excellent health until about four or five years ago, when he suffered a slight stroke. He recovered from this, and again busied himself with his medical practice. In the many emergencies he faced, he showed himself always equal to the task, and was an honor and credit to his profession. As a country doctor he ministered to thousands throughout his long life of service. He wanted to die at work, and his wish was granted him.

F. H. Archibald
1865-1936

DR. F. H. Archibald of Mahanomen, Minnesota, was born December 6, 1865, at Lindenwood, Ogle County, Illinois. He attended local schools and took college preparatory work at Dixon, Illinois. His medical degree was obtained from the College of Physicians and Surgeons, Chicago, in 1893.

Following graduation from medical school, Dr. Archibald practiced three years at Gibbon, Minnesota, and then at Atwater until 1906. For about a year he had offices at Breckenridge and Thief River Falls before moving to Mahanomen in 1907, where he had since practiced.

Dr. Archibald was always active in community affairs, having served at one time as health officer and on the school board and village council. He was a member of the Clay-Becker County Medical Society, the Northern Minnesota Medical Association, Minnesota State and American Medical Associations and the Mahanomen Masonic Lodge.

While at Atwater, Dr. Archibald married Josephine Baily, who preceded him in death in 1927. One son, Frank V. Archibald of Fargo, and a daughter, Adelaide of Mahanomen, were with their father when the end came, March 1, 1936.

Dr. Archibald was one of the first physicians in the region of Mahanomen, and during the war was the only doctor in the county. He was known to have been ever ready to respond when his services were desired.

Clifford Eugene Alexander
1901-1936

THE death, on February 9, 1936, of Dr. C. E. Alexander, our fellow practitioner, due to complications developing after a head injury, was very unfortunate. Most of us like to remember him because of his sincerity and subtle humor. He was essentially devoted to his large practice and, probably more than any others, his patients will miss him.

Born and educated in Minneapolis, he was graduated from the University of Minnesota in 1924. He then served his internship at St. Mary's Hospital, Duluth. In 1930, he completed a year's post-graduate study in Vienna, specializing in obstetrics and gynecology. He was associated with the Arrowhead Clinic.

Dr. Alexander was a member of the St. Louis County Medical Society, Minnesota State Medical Association, American Medical Association, and the staffs of St. Mary's and St. Luke's Hospitals.

His untimely death is deeply regretted. His wife and two children, Clifford, four years, and Nancy Jean, four months, survive him and to these we extend our sincere sympathy.

OF GENERAL INTEREST

Dr. Josephine Tofte has moved from Dawson, Minnesota, to St. Cloud, Minnesota.

* * *

Dr. F. M. Feldman, formerly of Minneapolis, is now located in Mankato, Minnesota.

* * *

Dr. O. F. Mellby of Thief River Falls was sent by his local club as a delegate to the District Rotary Club convention in Duluth in May.

* * *

Dr. Herman Hilleboe of St. Paul has been appointed to direct the crippled children's service under the State Board of Control as provided for by the Social Security Act.

* * *

Dr. Henry E. Michelson of Minneapolis has been selected to make the American contribution to the Festschrift of Professor Finger of Vienna, the noted Austrian syphilologist.

* * *

Word has been received of the marriage of Miss Bernice Chutkow of Los Angeles, California, to Dr. Julius L. Goldenberg, a graduate of the University of Minnesota medical school now located in Los Angeles.

* * *

Dr. Berenice Moriarty, Saint Paul, formerly associated with Dr. L. W. Barry, has opened an office at 312 Lowry Medical Arts Building, Saint Paul, for the practice of gynecology and obstetrics.

* * *

Word has been received of the death in California of Dr. Giles R. Pease, who for many years was a physician in Redwood Falls, Minnesota, before retirement from active practice several years ago.

* * *

Dr. Douglas M. Garrow of Rochester joined the Oliver Clinic at Graceville, Minnesota, June 15, where he will continue his practice in general medicine and obstetrics.

* * *

Max C. Kern of St. Cloud, son of Dr. and Mrs. M. J. Kern, received his degree in medicine at Creighton University, Omaha, Nebraska, early in June. He will serve his internship at St. Joseph's Hospital, St. Paul.

* * *

Dr. C. W. Rumpf of Faribault, Captain in the Medical Reserve, was elected president of the State Department of Reserve Officers at the convention of State Reserve Officers held in Faribault the latter part of May.

* * *

Dr. A. Erickson has opened an office in Sanborn, Minnesota, for the practice of medicine and surgery. He is a graduate of the University of Minnesota, class of 1934, and for two years has practiced medicine in the Des Moines, Iowa, County Hospital.

JULY, 1936

Dr. H. B. Ewens of Virginia was honored at the spring ceremonial of Aad Temple of the Shrine held in Duluth the latter part of May. Dr. Ewens is a representative to the Imperial Council and was especially honored as potentate of Aad Temple.

* * *

Dr. James J. Swendson of St. Paul talked to members of the Rice County Medical Society at the Faribault Clinic Rooms, Faribault, Tuesday, June 23, 7:45 p. m. on "Birth Control."

Dr. F. J. Lexa, delegate, reported to the society on the state meeting at Rochester.

* * *

Dr. J. P. Medelman recently became associated with Dr. Edward Schons in the specialty of x-ray diagnosis and treatment with offices at 572 Lowry Medical Arts Building, Saint Paul. Dr. Medelman spent five years with Dr. Allison and a year in x-ray work with a clinic in Texas before coming to Saint Paul.

* * *

Announcement has been received of the marriage on Monday, June 1, 1936, of Miss Anastasia Haley Hodgson of Fergus Falls and Dr. John Lohmann, who is a member of the medical staff at the state hospital in Fergus Falls. Mrs. Lohmann is a niece of Dr. and Mrs. A. C. Baker of Fergus Falls.

* * *

The marriage of Dr. E. M. Anderson of Lamberton, Minnesota, and Miss Mabel Gilland of Sleepy Eye, Minnesota, took place Thursday, June 4, in Minneapolis. Dr. and Mrs. Anderson are now at home in Lamberton, where Dr. Anderson has been engaged in the practice of medicine for the past year.

* * *

Dr. and Mrs. B. O. Mork, Sr., of Worthington, Minnesota, with their son and daughter-in-law, Mr. and Mrs. Raymond Mork, sailed for Europe from Montreal, Quebec, the latter part of June for a two months' vacation in Europe. They will visit first in France, going from there to Norway, where they will visit relatives and attend the World Sunday School convention in Oslo. En route home they will visit in England.

* * *

The Annual Graduate Fortnight of the New York Academy of Medicine will be held October 19-31, 1936, and will be devoted to the subject: Trauma; Occupational Diseases and Hazards. Twenty-three important hospitals in New York City will present coördinated afternoon clinics and clinical demonstrations. At the evening meetings various aspects of the subject will be discussed by prominent clinicians from various parts of the country. Those interested in registering for the course should communicate with Dr. Frederick P. Reynolds, The New York Academy of Medicine, 2 East 103rd Street, New York City.

* * *

At the close of the present academic year, Dr. E. P. Lyon, Dean of the Medical School, retired from active service at the University of Minnesota. During his administration, covering a period of twenty-three years,

the Medical School has exhibited steady and continued growth. As a fitting tribute to his stimulating leadership, the alumni and faculty of the Medical School propose to establish in his honor the Elias Potter Lyon Medical Lectureship at the University of Minnesota. The fund for this purpose is to be raised through subscriptions by alumni, faculty, students, and friends. Contributions to the Lyon Lectureship fund may be sent to Mr. William T. Middlebrook, Comptroller, University of Minnesota, Minneapolis.

* * *

June weddings of interest to members of the medical profession included the following: Dr. Raymond F. Hedin of Red Wing and Miss Lydia Elizabeth Anderson, also of Red Wing, June 19; Dr. Alvin Erickson of Hendricks and Miss Marion Piltingsrud of Leeds, N. D., June 12; Dr. John J. Boehrer of Minneapolis and Miss Jeanne Kathryn Halloran of Minneapolis, June 15; Herbert G. Bartholdi of Duluth and Miss Ruth Graham, daughter of Dr. and Mrs. Robert Graham, Duluth, June 20; Dr. V. A. Weed of Red Lake Falls and Miss Marjorie Kundert of Red Lake Falls, June 21.

* * *

The Extension Committee of the Medical School in coöperation with the Committee on Hospitals and Medical Education of the State Medical Association would appreciate an expression of opinion from the physicians of the state concerning courses for practitioners at the University.

1. What is the best time of year to hold these courses?
2. What subjects are most desired?
3. How long should the courses be?
4. Would you be interested in a resident course of two to four weeks' duration?

In order to serve better the physicians of the state it is urged that you answer by return mail, or as soon as possible, to R. R. Price, Director General, Extension Division, University of Minnesota.

* * *

At the 92nd Commencement exercises of Notre Dame University, honorary degrees were conferred on Dr. William J. Mayo and Dr. Charles H. Mayo, Mr. Francis P. Garvan, president of the Chemical Foundation of New York, and Archbishop Edward Mooney of Rochester, New York.

The graduating class of 428 students from thirty-nine states and four foreign countries was addressed by Dr. William J. Mayo. In his fifteen minute talk, entitled "Education Guides the Young to Good Citizenship," which was broadcast over the N.B.C. hookup, Dr. Mayo denied that the professions are overcrowded and stressed the need for research, particularly in the biological fields. The day preceding Commencement the cornerstone of a new Hall of Biological Research was laid at Notre Dame, in the planning of which the Drs. Mayo had contributed valuable advice.

Dr. Mayo's address appears on page 468 of this issue.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for July

The Minnesota State Medical Association Morning Health Service:

The Minnesota State Medical Association broadcasts weekly at 9:45 o'clock every Tuesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

July 7—Hardening of the Arteries of the Legs.

July 14—Contagious Diseases in Children.

July 21—Heart Disease.

July 28—Vacation Problem.

Medical Library Association

The Medical Library Association, which is international in its membership, including medical libraries in Canada and the United States and one each in England, China and Syria, met for a three day session June 22 to 24 inclusive at the Ramsey County Medical Society Library in Saint Paul.

The seventy-nine librarians who registered, mostly from twenty-two different states of the Union, heard addresses, during Monday at the Ramsey County library and after dinner at the Lowry Hotel, heard their president Dr. W. W. Francis, librarian of the Osler Library at McGill, speak on the past history of the Association. Dr. Francis is a nephew of the late Sir William Osler.

After the morning session Tuesday, those attending the meeting had luncheon at the Minnesota Union on the University Campus and in the afternoon visited the University of Minnesota library where a question box discussion of library problems proved most interesting. Upon demand of a number of registrants a visit was made to the University of Minnesota Dental College whose fame had spread afar. Tea was served the visitors at the Hennepin County Medical Society library in Minneapolis, which was followed by a bus tour of the lake residential district of Minneapolis.

On Wednesday the Association departed by bus for Rochester where it was welcomed by the Mayo Brothers and addressed by clinic members active in the clinic library at Rochester. Visits were made to the Institute of Experimental Medicine, the Museum of Hygiene and Medicine which houses the Transparent Man at one time exhibited at the Chicago World's Fair, and the Clinic Building.

On Sunday afternoon preceding the session visitors accepted the hospitality of Dr. and Mrs. William H. Von der Weyer at their summer place on Grey Cloud Island.

At the business meeting of the Association a resolution was passed requesting Congress to provide for the continuation of the Army Medical Library by providing

a suitable building to replace the present outgrown accommodations. It was also decided to take up with the American Medical Association a change in the reporting of the volume content of medical libraries, for the sake of uniformity.

Officers elected for the ensuing year were: Dr. W. W. Francis (Montreal), president; Mr. James F. Ballard (Boston Medical Library), vice president; Miss Janet Doe (New York), secretary; Miss Mary Louise Marshall (New Orleans), treasurer.

1937 State Meeting

The St. Paul Auditorium has been secured without charge for the 84th Annual Meeting of the Minnesota State Medical Association to be held in St. Paul in 1937.

Dates tentatively selected and subject to the approval of the Council of the Association are May 2, 3, 4 and 5. The new theater, the arena and Stem Hall will all be available to house the scientific sessions and exhibits which, with ample room in prospect, already bid fair to be the most extensive ever staged for these meetings.

Already 28 spaces have been reserved in advance by technical exhibitors who wish to be represented at the meeting. This extraordinary early reservation of space is indicative of the interest and importance of the Minnesota meeting.

Following are the names of these exhibitors:

Abbott Laboratories, North Chicago, Ill.
C. F. Anderson Co., Minneapolis, Minn.
Ayerst, McKenna & Harrison, Montreal, Canada.
Bard-Parker Company, Danbury, Conn.
Billhuber Knoll Corp., Jersey City, N. J.
Brown & Day, Inc., St. Paul, Minn.
Davies Rose & Company, Boston, Mass.
General Electric X-Ray Corp., Minneapolis, Minn.
General Heat & Air Engineers, Minneapolis, Minn.
Gerber Products Co., Fremont, Mich.
I. Kessell Company, St. Paul, Minn.
Lea & Febiger, Publishers, Philadelphia, Pa.
Lederle Laboratories, New York, N. Y.
Mead Johnson Company, Evansville, Indiana.
Wm. S. Merrell Company, Cincinnati, Ohio
C. V. Mosby Book Co., St. Louis, Mo.
Petrolagar Laboratories, Inc., Chicago, Ill.
Philip Morris Co., New York, N. Y.
Physicians & Hospitals Supply Co., Minneapolis, Minn.
W. B. Saunders Co., Philadelphia, Pa.
Schering Corp., Bloomfield, N. J.
Sonotone-Minnesota Co., Minneapolis, Minn.
E. R. Squibb & Sons, New York, N. Y.
The Tower Company, Seattle, Washington.
U. S. Hospital Supply, Minneapolis, Minn.

East Central Minnesota

The East Central Minnesota Medical Society held a dinner meeting at Pokegama May 26 with the Auxiliary. Following the dinner the physicians heard Dr.

Merritt Wheeler, St. Paul, on "Sinusitis and Its Treatment"; Dr. Edward Evans, Minneapolis, on "Fractures of the Hip," and Dr. Royal C. Gray, Minneapolis, on "The Psychopathic Hospital." The women held their regular Auxiliary meeting.

Redwood-Brown County Society

Dr. C. A. Saffert of New Ulm was elected president of the Redwood-Brown County Medical Society at the annual meeting held at New Ulm, in May. Dr. Francis Gibbons of Comfrey was named vice-president, Dr. Carl J. Fritsche, New Ulm, was re-elected secretary-treasurer, while Dr. O. J. Seifert, also of New Ulm, was retained as censor for another three year period. The members decided to inaugurate a medical economics committee. Members of the group are Dr. Albert Fritsche, chairman; Drs. T. F. Hammermeister and O. J. Seifert of New Ulm; Dr. A. P. Goblirsch, Sleepy Eye; and Dr. Arthur Wohlrabe, Springfield.

Southern Minnesota Medical Association

The annual meeting of the Southern Minnesota Medical Association will be held at Albert Lea on Sunday and Monday, August 30 and 31.

The Sunday night meeting will be addressed by some well known speaker who will talk on a popular subject, speaker and subject to be announced. Clinics will occupy the morning session, and formal papers the afternoon.

Dr. H. C. Habein, Rochester, is secretary of the organization.

The Nomenclature of the Corpus Luteum Hormone

The present unsettled statement of endocrinologic nomenclature has been the cause of increasing confusion in recent years. In an effort to remedy this deplorable situation, the Council on Pharmacy and Chemistry solicited the coöperation of a number of experts who have made fundamental contributions to glandular physiology. This group has been termed the Advisory Committee on the Nomenclature of Endocrine Principles. This Committee has considered the question of choosing an appropriate name for the one definitely established hormone of the corpus luteum. This hormone is defined and quantitatively estimated by its property of acting on the rabbit's uterus to produce histologic changes (progestational changes) resembling those observed during early pregnancy and pseudopregnancy. It has been demonstrated and agreed that this substance is represented by the formula $C_{27}H_{48}O_2$ (Δ^1 -17-acetyl-androstenone-3) and that no other natural substance has as yet been found having the same physiologic properties. On the recommendation of the Advisory Committee, the Council adopted the following terms: (1) *progesterone* to indicate the chemically pure substance having the formula and properties mentioned above; (2) *progestin* as a general term to indicate the substance (and other chemically allied substances having similar action, in case any such compounds are subsequently discovered) without reference to the state of chemical purity, for convenience in clinical and biologic speech and writing.—(J. A. M. A., May 23, 1936, p. 1808.)

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of May 13, 1936

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club, on Wednesday evening, May 13, 1936.

The meeting was called to order at 8:15 by the president, Dr. Thomas S. Roberts. There were forty-eight members present.

Minutes of the April meeting were read and approved.

The scientific program followed.

EPIZOÖTIOLOGY OF TULAREMIA IN MINNESOTA

ROBERT G. GREEN, M.D.
Minneapolis

Dr. Green, of the Department of Bacteriology and Immunology of the University of Minnesota, read his Inaugural Thesis on the above subject. Lantern slides were shown.

Abstract

Prevention of human infections of tularemia depends upon an understanding of the occurrence of this disease in animals and the control of human contacts with the animal infection.

Among animals, tularemia is transmitted almost entirely by intermediate hosts, and the disease varies from a mild, symptomless infection in some species to a violently fatal disease in others. In the cottontail rabbit, tularemia is an acute, highly fatal disease and occurs as local epizootics devastating to this species. In snowshoe rabbits, tularemia is a relatively mild infection and does not produce an appreciable mortality. Epizootics of this mild infection develop in snowshoe rabbit populations each spring with the advent of ticks from hibernation. Upon epizootic spread of tularemia among cottontail rabbits, the infection in ticks increases. With the spread of tularemia among snowshoe rabbits, no appreciable increase in tick infection occurs. Grouse appear to be more susceptible to tularemia than the snowshoe rabbit, and indications are that natural infections in this bird are not uncommon.

Wood ticks in Minnesota occur during late spring and early summer and vary greatly from year to year in percentage infection with tularemia. The highest rate of infection found in Minnesota has been 0.25 per cent. The infection in wood ticks is obtained principally from small rodents and not from rabbits.

While tularemia is generally quiescent in the winter months, it may be found in snowshoe rabbits in mid-winter as a chronic pulmonary process. Tularemia may occur occasionally in cottontails from transmission by fleas, which remain active all winter.

The greatest hazard of human infection with tularemia in Minnesota is from wood ticks during the months of May and June, and from direct animal con-

tact during the months of September and October. The incidence of tularemia in both wild animals and ticks is at very low ebb during the months of July and August. In the absence of ticks from November until March, tularemia is of rare occurrence among wild animals.

Discussion

DR. J. M. ARMSTRONG, St. Paul: How does tularemia affect the snowshoe rabbit? Is this animal infectious after November?

DR. GREEN: The snowshoe rabbit ordinarily does not show symptoms of tularemia and the abscesses typical of this disease in many animals are not usually found if the snowshoe dies. After a quiescent state during the summer, tularemia appears in the snowshoe rabbits during September and October. There is a period in the latter half of October and the first part of November when infections among hares still occur but are not common. An occasional hare will develop tularemia even in December. There is a chronic pulmonary tularemia that we have found persisting throughout the winter months. This infection is much like pulmonary tuberculosis. It would seem that the big hazard of tularemia in snowshoe rabbits is past in Minnesota, early in November.

DR. C. M. CARLAW, Minneapolis: I would like to ask about the portal of entry. Is this disease contracted through the gastro-intestinal tract or through the skin?

DR. GREEN: The infection is commonly contracted through the skin from the blood of an infected animal or from the bite of a wood tick or deer fly. Infection through the gastro-intestinal tract has occurred from the eating of infected rabbits not thoroughly cooked; but this is, of course, unusual.

DR. JOHN BUTLER, Minneapolis: Will you differentiate between the ulcero-glandular and oculo-glandular types? Are they the same?

DR. GREEN: The only significant difference between these two types of tularemia is the local lesion. In the one case the local lesion is an ulcer in the skin and in the other the primary lesion is a characteristic conjunctivitis.

DR. BUTLER: What is the significance of the glandular type?

DR. GREEN: Passage of the organism through the intact skin will produce the glandular type of disease in animals and experimentally one similar infection has been produced in man. The ulcer formation appears to be a combination of an injury and infection by the organism.

DR. BUTLER: What do you consider the significance of the typhoidal type?

DR. GREEN: That is rather an enigma at the present time. The typhoidal type has occurred principally in laboratory workers. Some investigators believe that this type of disease develops after the passage of the organism through the intact skin. It is my opinion that most laboratory cases have followed infection through the upper respiratory or gastrointestinal tract. We have found definite evidence of a difference in the

virulence character of *Pasteurella tularensis* when the organism is first isolated from different animals. I have a feeling that the characteristic laboratory infection is produced by a strain of the organism modified by passage through guinea pigs. Only a few cases of the typhoidal type have been reported from general practice and it may be that these infections are due, in part, to a peculiar natural animal source either directly or indirectly.

DR. W. R. RAMSEY, St. Paul: Have you found anything that can be used as a protection against the ticks?

DR. GREEN: When one has been exposed to ticks, clothing should be removed and a careful examination for ticks made within three or four hours. The infection does not appear to come from the bite of the tick directly but rather from contamination of the wound with tick feces, which contain the organism. If a tick has become attached, I advise that a disinfectant be applied to the tick before removal and also to the surrounding skin area. The fingers should be wet with disinfectant when the tick is pulled off. The wound produced, as well as the surrounding skin, should be treated with an effective germicide.

DR. BUTLER: Surgical interference has been suggested for treating the ulcero-glandular type of tularemia. I would like to know whether surgical interference is indicated in the glandular type of disease before suppuration of the lesion?

DR. GREEN: It is my opinion that no lymph node in any type of tularemia infection should be incised until the lymph node has actually softened. Many lymph nodes enlarged almost to the point of suppuration will begin regression and cause a minimum of difficulty. Once infection has been performed, however, a chronic ulcerative lesion will usually develop.

DR. H. W. GRANT, St. Paul: Are the ticks found on moose in the spring infected with tularemia?

DR. GREEN: No. The moose tick has never been found infected with tularemia. This tick is a different species from the wood ticks that bite man, and many attempts to demonstrate tularemia in these ticks have all yielded negative results.

DR. RAMSEY: What would you consider a good disinfectant to use in a case of a tick bite?

DR. GREEN: Apparently any standard disinfectant is sufficient to kill *Pasteurella tularensis* very easily. Dr. R. R. Spencer, of the United States Public Health Service, has shown that castor oil soap, developed by Dr. Larson, is a specific for this organism. *Pasteurella tularensis* dissolves very quickly in castor oil soap.

DR. RAMSEY: Is there any kind of oil one can put on to keep the ticks off?

DR. GREEN: I do not know of any tick repellent that is of any value.

DR. C. B. DRAKE, St. Paul: Is there a possibility of developing a serum against tularemia?

DR. GREEN: Such a serum has been developed by Dr. Lee Foshay of the University of Cincinnati and this serum is apparently now coming into rather general use. The serum is made by the hyperimmunization of goats. There would appear to be no doubt that this serum is of great value in the treatment of tularemia. Like other serums, it must be used early in the course of the disease to exert its maximum influence.

DR. BUTLER: The initial lesion of sporotrichosis is not unlike the initial lesion of tularemia. Can you

differentiate between that disease and tularemia by any means other than the agglutination test?

DR. GREEN: A differential diagnosis may also be made, and much earlier, by direct isolation of the organism from the original sore. If scrapings of the lesion are taken early and injected into guinea pigs, a diagnosis of tularemia may be established in from four to six days.

DR. DRAKE: How early can diagnosis be made?

DR. GREEN: Diagnosis can be made by animal inoculation in about a week's time. The skin test being developed by Dr. Foshay will give the earliest diagnosis. In one of our laboratory cases the first symptom, a high fever, was shown at ten o'clock in the evening. The skin test done at ten o'clock in the morning was slightly positive the following day. The patient gave a negative skin test a short time previous to infection. In this individual a skin test five days after the onset gave a very positive reaction. A difficulty with the skin test is that it gives some false negatives and a few very exaggerated positives which may even produce severe general reaction. It seems to me that routine early diagnosis of tularemia could be made by the use of three graded skin tests. The first skin test would be very dilute material for those highly sensitive. A second skin test would be applied the following day to those not reacting to the first, thus eliminating unduly severe reactions. A third skin test of more concentrated material could be used on the third day for those not giving reactions on the first and second days. If this could be worked out, the maximum benefits from the early use of serum could be obtained.

DR. MOSES BARRON, Minneapolis: As I understand it, the name comes from Tulare County in California.

DR. GREEN: That is true.

DR. DRAKE: Is there any tularemia in Europe?

DR. GREEN: It is known in the Scandinavian countries, Germany, Russia and Japan, but is not yet known in southern European countries.

DR. DRAKE: Is it an old disease?

DR. GREEN: Yes. There is every reason to believe that the disease has always been present in North America.

DR. S. E. SWEITZER, Minneapolis: What is the material as used is so dilute that it looks like clear water.

DR. GREEN: It is a preparation of the killed organisms which has been treated with nitrous acid which cuts down the toxicity to a great degree. The material as used is so dilute that it looks like clear water.

DR. KENNETH BULKLEY, Minneapolis: Has hyperpyrexia been tried in these cases, if the temperature apparently affects the organism?

DR. GREEN: My idea that temperature is a limiting factor in the distribution of this disease is, of course, little more than an idea. It might well be that such is the case and that this infection would respond to treatment by hyperpyrexia. However, the more severe cases of this disease have a high sustained temperature.

DR. JOHN BROWN, St. Paul: Have you studied tularemia in reference to cold-blooded animals? I have found ticks on the legs of turtles at times.

DR. GREEN: Tularemia in cold-blooded animals has not been investigated to my knowledge.

The meeting adjourned.

R. T. LAVAKE, M.D., Secretary.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

CERTIFIED MILK. Proceedings of the A.A.M.M.C. A.M.P.A.A., and M.C.M.P., 1932, 1933, 1934 and 1935. 363 pages. Cloth. Certified Milk Producers' Association of America, Inc., 1936.

EXOPHTHALMIC GOITER AND ITS MEDICAL TREATMENT. Israel Bram, M.D., Medical Director Bram Institute for the Treatment of Goiter and Other Diseases of the Ductless Glands, etc. 456 pages. Illus. Price, cloth, \$6.00. St. Louis: C. V. Mosby Co., 1936.

SYNOPSIS OF DISEASES OF THE HEART AND ARTERIES. George R. Herrman, M.D., Ph.D., Professor of Clinical Medicine, University of Texas. 344 pages. Illus. Price, cloth, \$4.00. St. Louis: C. V. Mosby Co., 1936.

DISABILITY EVALUATION. Principles of Treatment of Compensable Injuries. By Earl D. McBride, B.S., M.D., F.A.C.S. Assistant Professor in Orthopedic Surgery, University of Oklahoma, etc. 623 pages. Illus. Price, \$8.00 cloth. Philadelphia: J. B. Lippincott Co., 1936.

THE SINGLE, THE ENGAGED, AND THE MARRIED. Maurice Chideckel, M.D. 268 pages. Price \$2.50. New York: Eugenics Pub. Co., 1936.

In this book the author has handled a delicate subject with commendable finesse. The fact that he not only cites many cases from his own practice, but that he also exhibits a knowledge of the literature on the subject, shows that he has the necessary background to discuss these matters. As the title suggests, he has divided the sex life into three periods, and he frankly discusses the problems peculiar to each, giving definite advice as to how to meet those problems. This sensible and well-written treatise on an important subject can be read with profit by both laymen and physicians.

L. W. BARRY, M.D.

PARENTERAL THERAPY: a ready reference manual of extra-oral medication for physicians, dentists, pharmacists, chemists, biologists, nurses, medical students and veterinarians. By W. F. Dutton and G. B. Lake. Springfield, Ill.: C. C. Thomas, 1936.

To those physicians who by experience know the accuracy and effectiveness of parenteral medication, the new book on this subject by Dutton and Lake will strengthen them in their efforts to make the practice of medicine more scientific. To those practitioners who have not yet used this very simple and direct method of treatment, parenteral therapy should prove to be the "opportunity to arrive" which they have long been hoping would knock at their door. This type of therapy has long been overlooked and neglected because the technic had not been accurately described. Now the authors of this book cover completely and in detail this type of administration of therapeutic substances.

It is a stimulating discussion of all phases of the use of the "hypo" needle from the simple subcutaneous injection to the more complicated cisternal puncture. To my mind the three chapters on intravenous medication are most important because of the great variety of physical impairments which can be treated successfully by this method.

The book is direct in its approach, precise in its description of technic, much of which is beautifully illustrated, and exact in its instruction, not forgetting the necessity of being cautious and in looking for danger signals. Dutton and Lake show more clearly than any other current author the fundamental principles of parenteral medication.

NORMAN M. SMITH, M.D.

Larostidin "Roche" Not Acceptable for N.N.R.

The Council on Pharmacy and Chemistry reports that in the latter part of 1934 and in 1935 the medical profession was deluged with propaganda for "Unquestionably the most notable advance in the medical treatment of Gastric and Duodenal Ulcer," Larostidin "Roche." According to the advertising, this is a 4 per cent solution of *laevo*-histidine-monohydrochloride in an isotonic medium. The Council questioned some of the claims made by Hoffmann-La Roche, Inc., and initiated a series of experiments to determine the usefulness of histidine hydrochloride and Larostidin "Roche" in treating gastric and duodenal ulcer as compared with the diet-alkali regimen. The results of this investigation are reported in *The Journal A. M. A.*, April 25, 1935, p. 1468 (Martin, K. A.: "Histidine versus Diet and Alkalies in Treatment of Peptic Ulcer"). The investigator reported that the symptomatic and radiologic response of forty-one patients in the injection series was not quite so good as that of the forty control patients in the diet-alkali series, in either the initial or the sustained effects. As a result of its consideration of the paper of Martin and others, however, the Council concluded that, although there is at present insufficient clinical evidence for its evaluation, histidine hydrochloride shows promise of possible usefulness in the treatment of gastric and duodenal ulcer. The Council declared Larostidin (Hoffmann-La Roche, Inc.) not acceptable for New and Non-official Remedies because it is marketed with unwarranted therapeutic claims, and voted to postpone further consideration of histidine monohydrochloride until adequate clinical evidence of its therapeutic usefulness is available. (*J. A. M. A.*, April 25, 1936, p. 1473.)

Chemistry of Vitamin E

In a recent communication, Evans and his collaborators at the University of California (*J. Biol. Chem.* 113:319, February, 1936) report the successful isolation from wheat germ oil of an alcohol having the properties of vitamin E. The material was obtained as an oil, and it exhibited sporadic vitamin E activity in doses of 1 mg. The investigators propose for this alcohol the name "*a*-tocopherol," from the roots "*tokos*" meaning childbirth, "*phero*" to bear and the ending "*ol*," indicating an alcohol. Two crystalline derivatives of this physiologically active oil were prepared, and the elemental analyses of these compounds indicate an empirical formula of $C_{50}H_{90}O_2$ for the vitamin itself. The isolation of the vitamin itself in crystalline form and establishment of its chemical configuration should give some interesting insight to its rôle in the organism and to the mechanism of its activity. (*J. A. M. A.*, April 25, 1936, p. 1496.)

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

Volume 19

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Number 8

THE DOCTOR AND MODERN ECONOMICS

W. W. WILL, M.D.

Bertha, Minnesota

WHEN the president of the Minnesota State Medical Association rose to address his colleagues on the occasion of the annual meeting of the society in the days of our fathers, it was usually to make an oration, but never to review the events of his own administration as president of his association.

But today medicine and the activities of the state medical associations have changed. The interests of the medical man are economic and social as well as scientific. He is vitally concerned in the social trends of the times. His organization is leading in the defence of human rights against the allied slaveries of communism and its derivatives on the one hand and fascism on the other.

That is why I venture to talk to you tonight about the work of this association during the past year, confident that doctors and their wives of 1936 will want to know where organized medicine stands in Minnesota today in relation to other directing influences in our lives.

1. Are the doctors of Minnesota taking their proper place in the handling of the tremendous problem of relief for the sick poor?

2. Are they aware of all the changes to which the Social Security Act has opened the door? Are they taking hold with a good will and keen foresight, to keep the expenditure of Social Security funds within the legitimate limits of needed public health work, or are they allowing too much of it to line the pockets of politicians?

3. Are they doing their share to keep state legislators informed about the menace of quacks and the need for laws to keep them from preying upon the sick and helpless?

4. Are they doing their share to educate these same people in the fundamentals of good health and of disease prevention so as to protect them from cults and patent medicine and fake healers?

5. Are they reaching out to join hands with the men and women of allied professions for the mutual protection of their own interests and for the public good?

6. Are they working with the women of the Auxiliary so as to utilize their unquestioned influence in the councils of the important women's organizations of the country, the Women's Federations, the Parent Teacher Associations, to prevent them from going off at costly and dangerous tangents in the matter of health and public welfare?

These are important questions. Some of them I should like to answer by a résumé of actual accomplishments this year.

When the SERA wound up its activities this year, medical care for relief clients was working smoothly under SERA regulations. This SERA plan for care of the relief clients was a vast improvement over the system, or lack of any system, in existence in many parts of the state before that time. In consequence, a good many people were receiving good medical care early for troubles that once were left untreated. Physicians were receiving for the first time in years a sufficient fee to cover the cost at least, of caring for these people. And the whole plan was working with a minimum of dissatisfaction and complaint from any one. It is to the great credit of physicians that relief workers from many parts of the state have heartily commended the cordial and helpful manner in which the doctors of the state coöperated in their work.

*Presented at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, June 4, 1936.

Differences and misunderstandings were ironed out in most places by the Committees of Three organized more than a year ago by the state society. The whole program served an invaluable purpose in showing doctors, relief workers and county officials that care for the poor on the basis of free choice of physician is a practicable and desirable plan.

The Minnesota State Medical Association and organized medicine in general, as you know, regards the free choice of physician to the patient as fundamental to good medical care in any class of society. Your Council passed a resolution re-affirming that stand.

When federal funds were no longer available for direct relief in the state, the SERA ended, as such. New plans for medical care of the sick poor had to be made. But the depression and the nearly universal collapse of local county and township machinery for caring for the poor and needy came close to wiping the slate clean of ancient and outworn machinery for caring for the indigent.

Funds for medical care and for relief of all sorts were restricted to county funds aided by a limited allotment of state funds.

The opportunity was provided for negotiations on a new basis between county officials and physicians—literally, the opportunity of a lifetime, for the physicians and for the sick poor whom they serve.

It is to the credit of a great many of the men who are here tonight that they seized so quickly upon this opportunity and already are established with their county commissioners, or the welfare board appointed by the commissioners, on a sound basis of free choice for the patient and a small remuneration, at least, for the work done by the physician.

Others are engaged in negotiations now and only a few, comparatively, have returned to the unfortunate and undesirable system of a hired county physician for care of all the sick poor.

The state association is making one of the greatest efforts in its history to assist its members everywhere, but particularly in the rural districts, to take advantage of this unique chance to settle once and for all that most difficult and troublesome of all economic problems, the care of the sick poor.

The importance to the future of medicine in

Minnesota of successful negotiations with the officials of each county cannot be overestimated. It is through the needs of the poor and the wholly indigent that unwholesome experiments to provide care take their origin and fasten themselves upon us. If we are laggard in forestalling such experiments, if we fail to work wholeheartedly for a sound solution of the problem, then we are the losers as well as the sick. We shall certainly wake up some fine day to find the whole problem—and with it our independence and integrity as a profession—removed from our shoulders.

Our relation to the Social Security program made possible through the Social Security Act is only now taking shape. We hope, by means of careful coöperation between our Council and Dr. Chesley and the State Board of Health, and by the interest and assistance of every member of this association, to assist in extending needed services with these funds to those who now lack them.

No one doubts the need of more funds for the fundamental public health services. Ideally, of course, these funds should be raised in the communities that are to benefit by them. When federal subsidies are available local sources of funds are only too likely to dry up; the sense of local responsibility for the handling of community problems is likely to suffer also.

It must be our business as physicians and as responsible citizens to take a more active part than ever before in the public health work of our communities. That way and that way only, shall we be able to avoid waste of funds upon arbitrary programs dictated from outside without knowledge of local conditions, to direct the program into wholesome and appropriate channels, to keep alive a local interest and responsibility without which the mere expenditure of funds will in the long run be of very little use to any one.

We have long recognized our obligation to extend public knowledge of the fundamentals of healthy living and to protect the public from the predatory quack and from the unbalanced cultist and fanatic. That is a fundamental obligation of the doctor. As an organization we have maintained a notable contact with our legislature. We have carried on a weekly radio program, weekly news services, college lecture courses, other pub-

lic talks as they are requested, for years. These are essential services that must continue no matter what federal programs of public health education are dangled before us in dazzling prospect. We can and we must do more, individually, both as medical men and auxiliary members, to educate patients and associates. This is part of the personal obligation of the doctor to his patient. It cannot be left wholly to a bureau any more than diagnosis of disease can be left to a bureau. I want to urge every man here to steel himself anew against the fatal temptation to let the outside organization or the welfare worker or the health department do it. It may be that the health department or the school clinic can immunize your young patient effectively enough against diphtheria and, too, conveniently for you. That does nothing whatever to cement your friendly relationship with that young patient who needs to know you as a friend and the source of all wisdom and aid for all his life so far as his physical well being goes. You cannot in conscience farm out part of your services to that child.

This matter of lay education has many ramifications. It came up in an entirely new guise this year in connection with the year's debates among high school and college students on the subject of state medicine.

Now debates as a rule are mere intellectual exercises so far as young orators are concerned, and do not greatly affect opinions or disturb normal relations in real life. But this year's subject, involving illness and the handling of illness, touched the public rather closely and considerable interest was evinced not only by coaches but by debaters themselves in the subject.

Our state society exerted itself to assist both coaches and debaters to prepare for these debates. We urged upon our members that it was really important to see that these youngsters had a chance to learn the truth about medical problems and the doctors' point of view toward state medicine. It was not only the opinions of these young debaters but those of their thousands of elders who would hear the debates that might be crystallized one way or another by these debates.

I am sorry to have to report to you tonight

that our assistance to these young debaters was not as effective as we hoped it might be.

Perhaps the fault lay with us and the material we supplied. Perhaps it lay with our membership, which in many instances was too busy and too indifferent to see that local high schools had the material available from both the American Medical Association and state association headquarters and to lend the personal assistance and explanation that was vital to the understanding of immature youngsters of this difficult and complicated subject.

Our latest information on the results of the regional debates in the state indicates that the affirmative, favoring "a system of medical care at government expense for all the people," had the best of it.

In themselves, no great importance attaches to these debates, perhaps. We know that public opinion as a whole in Minnesota is in no mood as yet for state medicine. We cannot blink the fact, however, that the tendency of all "planned economy" is toward coöperatives as our major political party terms them, group protection and immunity of the individual from ultimate responsibility for his own well being.

We, as physicians, are not prepared to fight a whole social philosophy. We *are* prepared to interpose our influence against a sweeping tendency to remove from the individual all rights and responsibilities. We believe that in America, at least, there is no need to sacrifice a great profession, a scientific development that is the wonder of the world, and the individual right in the selection of one's own doctor, to a social idea.

We believe that reforms can be made if necessary in governmental practices, in our banking system, and even in our distribution of wealth, without sweeping the best developments of American life into the discard.

But we must organize closely and fight cannily to maintain that belief. If we are strong enough and vigorous enough and wise enough we can prevail. If we are indifferent and selfish and hesitant we stand to lose more than our independent and professional integrity. America stands to lose one of its finest institutions—the family doctor.

STUDIES IN WATER BALANCE, DEHYDRATION AND THE ADMINISTRATION OF PARENTERAL FLUIDS*

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REST, water and food have been recognized for centuries as the keystone in the care of the sick. In many illnesses the normal intake of fluids is unhampered, but in others the need for and value of administering fluids by channels other than the gastro-intestinal tract is generally known and appropriate methods for doing so are widely used. The amount of fluid to give in the latter cases is entirely in the hands of the physician, and, while experience has been a fairly reliable teacher, it was apparent to us that the handling of the water requirements of the sick patient by figures based on facts would be of merit. Accordingly, an investigation of the water exchange of surgical patients under the various conditions of disease and treatment was begun four years ago. Before presenting the results of these studies, a brief review of normal water exchange is in order.

Normal Water Exchange

Water becomes available to the body from two main sources and is normally excreted through three channels. These can be listed as follows:

Available Water

1. Fluids drunk
2. Food: Diet or body tissue
 - a. Water content
 - b. Water of oxidation

Excreted Water

1. Water of urine
2. Water of stool
3. Water vapor

In response to various demands a balance between the factors of intake and output maintains the water content of the body at a fairly constant level of approximately 70 per cent of the total body weight.

While our first thought on water intake is that of fluids drunk, it is of interest that the water available from the solid food of a routine maintenance diet frequently furnishes more than half of the total daily supply. This water from food comes from two sources: its water content, and

water formed on the combustion of the constituent proteins, fats and carbohydrates. In this way a little more than nine-tenths of a gram of water is furnished by each gram of solid food eaten, the total food for the day yielding 1,000 to 1,500 c.c. of water. When no food is eaten, body tissue is burned for energy and its water content and water of oxidation likewise become available. Under this condition a great deal of the tissue used is fat, the water content of which is very low, so that only 400 c.c. or so of water daily is available from this endogenous source in starvation.

Fluids drunk generally vary from 800 to 2,000 c.c. daily. When the sweating loss is high, as with hard physical labor or with high temperatures and humidities, larger volumes are ingested.

The output of water is normally concerned with two functions: the excretion of waste materials in solution by the kidneys, and the dissipation of heat by the vaporization of water from the skin and lungs. The third loss, that of water in feces, is normally of no consequence, since it is seldom more than 150 c.c. daily.

Water for vaporization plays an important part in the dissipation of body heat and control of body temperature. The skin encloses a mass of very fluid tissue and always has some moisture on its surface, even without activity by the sweat glands. Under these conditions, vaporization of water from the skin and lungs dissipates 24 per cent of body heat, the process at this rate having been shown by Newburgh and his associates to require for the normal adult from 1,000 to 1,500 c.c. of water daily. The remaining 76 per cent of body heat is dissipated by radiation, conduction and convection from the skin surface. As environmental temperature increases, these latter methods of heat dissipation are less effective, and the sweating mechanism, which can be considered as the safety factor in heat dissipation, pours water upon the surface of the body for vaporization, until up to 100 per cent of total body heat may be dispersed by this process and several liters of water may be used by it daily.

*From the Department of Surgery, University of Michigan. Read before the Minnesota State Medical Society, Minneapolis, Minnesota, May 5, 1936.

It is important to emphasize that the vaporizing process, in contrast to water for kidney function, is little affected by the amount of water available. There is no mechanism whereby, when the water supply is low, temperatures can be controlled with the use of less water than usual. In deprivation of water for long periods of time the urine output may drop to almost nothing, insufficient water may be available to keep internal body temperature within normal limits, but water still continues to be vaporized from the skin and lungs until critical dehydration and death occurs. Water for vaporization apparently has "preferential rights" on available water.

On the other hand, the kidneys, through their concentrating mechanism, may carry out their normal function with variable amounts of water, the quantity so used depending upon the water available after the preferential processes have been cared for. With the usual drinking and eating, the balance between the intake and output of fluid is largely maintained by the kidneys. It is extremely important to remember that on this basis a satisfactory ingestion of water is shown by a good urine output, and that a small volume of urine of high specific gravity practically always indicates insufficient water.

Turning now to the surgical patients, the results and thoughts from the study of this group can be presented under the following headings:

Dehydration Attendant on Surgical Operations

It is common knowledge that on the day of a major operation a restriction of the fluid and food intake by most surgical patients reduces the quantity of available water. Along with this, abnormal losses of fluid generally occur. Our first study on water exchange was to evaluate these losses when they seemed to be greatest, that is, in the operating room and in the immediate post-operative recovery period of four hours, when the patient is bundled up with extra blankets and frequently perspires profusely.

For abdominal operation the blood loss was generally greater than that estimated by the operating surgeon. The largest amount in the series of cases was 1,272 c.c., shed during a radical mastectomy on a large, obese woman. The patient showed moderate post-operative shock.

The total fluid loss by blood, vomitus, urine,

and vaporization, for major operations, during the operative and four hour post-operative period averaged close to one liter. Water vaporized from the skin and lungs comprised 70 per cent of this figure. We learned that we could materially reduce the sweating loss by doing away with the extra blankets of the old-fashioned "ether bed." The patients also were much more comfortable by simply placing them post-operatively in a hot-water-bottle-warmed bed with only the usual covers. Water needlessly lost was thus saved and the urine volume on the day of operation correspondingly increased. This procedure has been adopted as a satisfactory routine on the surgical service, with no increase in post-operative pulmonary complications.

As a result of the restriction in fluid and food intake and the increased fluid losses, most patients dehydrate to some extent on the day of their operation. Usually this is not severe and conditions are generally such that more fluid can be taken by the patient on succeeding days, with the water exchange returning to normal. Occasionally, as mentioned previously, fluid cannot be handled by the gastro-intestinal tract, and must be given through other channels. The quantity to be administered in such instances, of course, depends upon the physician, and he can only decide upon the proper amount to give when he knows what fluid losses must be taken care of. Our second study of water exchange was carried out to furnish data on this problem.

The Daily Water Losses of Surgical Patients

Like the healthy adult, the excretion of water by the surgical patient is for two normal functions: the carrying away of water materials through the kidneys, and the dissipation of body heat. Since the latter process seems to have first choice on the available water, and the kidneys work largely with what is left, our problem was to learn what the vaporizing loss amounted to in a group of representative surgical patients. Briefly, the method for this determination was as follows: The patient, lying on a Bradford frame, was weighed at 8:00 A. M. The weight of all ingesta and excreta up to 8:00 A. M. the following morning was obtained, at which time the patient was again weighed.

The total insensible loss of weight for the 24 hour period was calculated by the following equation: Beginning weight—(end weight—ingesta + urine and stool and any abnormal loss). This total insensible loss is the result of the continuous vaporization of water from the skin and lungs and the respiratory exchange of carbon dioxide for oxygen. Water, however, usually comprises more than 90 per cent of the insensible loss, and for our purposes the loss was considered to be entirely water, with little error.

It was found that the average adult patient, convalescing smoothly from a major operation, vaporized from 1,000 to 1,500 c.c. of water daily.

This is the same amount that these individuals would vaporize when up and about at normal routine activities without sweating. A girl weighing 66 pounds vaporized 850 gm. daily during an uneventful convalescence from a simple major operation.

Some conditions met with in surgery increase the insensible loss. Several patients with hyperthyroidism were studied and their water of vaporization amounted to from 1,500 to 2,000 c.c. daily. This increase above the normal was simply found to be due to the fact that they have more heat to dissipate, there being no increase in the percentage of heat dispersed by the vaporizing process. With fever also there is an increase in heat production, and a tendency to sweat. The water of vaporization of several patients with fever varied from 1,500 to 2,500 c.c. daily. In general, for the sick surgical patient, water for vaporization can be safely estimated at two liters per day.

With this figure for vaporization at hand, water for urine was the next problem. The amount available should be sufficient to permit the kidneys to excrete waste materials presented to them without having to work at their maximum capacity. For the sick surgical patient we believe this to be an output of at least 1,500 c.c. of urine daily.

This volume was selected purely on a consideration of kidney function. Lashmet and Newburgh determined the excretory capacity of kidneys of various concentrating ability, and the following figures on the minimum amount of water needed to excrete 35 gm. of waste materials, an average daily amount, were calculated from their data:

Maximum Concentrating Kidney Ability.	Sp. Gr. of	Minimum Amount of Water Required to Excrete 35 gm. of Waste Materials
Normal.	1.032—1.029	473 c.c.
Diseased.	1.028—1.025	595 c.c.
	1.024—1.020	605 c.c.
	1.019—1.015	850 c.c.
	1.014—1.010	1439 c.c.

From these figures it is evident that an individual with normal kidneys needs to excrete about 500 c.c. of urine a day for normal function. With an output of urine appreciably less than this, retention of waste materials can be looked for, and the blood non-protein nitrogen will generally be found elevated. With diseased kidneys, more than 500 c.c. of urine daily is needed. In instances of the most severe renal damage, where the kidneys can concentrate urine to a specific gravity of only 1.014 to 1.010, the figures show that close to 1,500 c.c. of water is required to excrete the daily wastes. A minimum output, then, of 1,500 c.c. of urine daily by all sick surgical patients insures normal kidney function, and this is the amount allowed for urine in our estimations of water requirements.

Frequently abnormal losses of fluid have to be considered in the water exchange of the sick surgical patient. Blood, vomitus, drainage from intestinal and biliary fistulae, diarrhea, massive exudation from inflamed surfaces, and sometimes sputum may carry away important amounts of water and materials from the body. Such losses are "absolute losses" in that they carry out no physiological function and take water that is needed for normal processes. The amount of the abnormal losses, such as vomitus, drainage from intestinal and biliary fistulae, and sputum should be measured by the nursing staff and recorded on the patient's record.

To summarize, a calculation of the amount of water to be given daily to maintain the normal body fluids of a surgical patient who, because of his disease or treatment, is unable to take food or fluid by mouth would be as follows:

1. Water for vaporization	2000 c.c.
2. Water for urine	1500 c.c.
3. Abnormal losses of water—vomitus, etc.	.....
Total	3500 c.c.

If the patient is taking some fluid by mouth that amount can be deducted from the 3,500 c.c. total. If abnormal losses are occurring, they should be added, since with a failure to do so the seemingly sufficient 3,500 c.c. total may be

entirely inadequate. The resulting poor urine output in such instances is often erroneously attributed to a reflex or toxic suppression of kidney function, whereas the real fact is that the surgeon did not supply the patient with enough water. There are many causes of anuria, but no others should be considered until the water exchange of the few previous days has been checked over and dehydration as the etiological factor eliminated.

Water Balance of the Dehydrated Patient

Patients who enter the hospital in a dehydrated condition present an additional problem in water balance. An amount of water sufficient to maintain body fluids is not enough for them, but an additional amount is necessary to restore the body water previously lost. If one knew how much fluid had been previously lost, water for its restoration could be given in a quantitative fashion similar to water for the maintenance of body fluids. There are no quantitative tests to show the degree of dehydration, so the only answer to the problem seemed to be a determination of the amount of water individuals need to lose in order to show the common clinical signs of dehydration, and to provide that amount of water when patients are seen with those signs.

To furnish data in this regard two normal subjects were dehydrated by withholding water until the beginning signs of serious dehydration appeared: a dry hot skin, a dry tongue, sunken eyes, a little fever, and a urine output insufficient to excrete the normal waste materials. This last finding was the only readily measurable sign and was used in this way that the dehydration of both subjects was continued until their blood non-protein nitrogen had increased to a little above 40 mg. per 100 c.c. When this occurred all of the common clinical signs of dehydration mentioned were well established. As evidence of the adverse conditions under which the kidneys were working, the urine of the 26 year old subject finally reached a specific gravity of 1.041 and contained a trace of protein and more than the usual number of casts and erythrocytes.

The water balance data of both subjects showed that the signs of serious dehydration produced were the result of being depleted of an amount of water equal to approximately six

per cent of their body weight. Observations by several members of the investigating staff during the past three years support the opinion that when the signs of serious dehydration are present in a patient, body fluids of at least the same proportion have been lost. The following figures show what this amounts to for individuals of various weights:

	6 per cent
10 kg—22 lbs.	600 c.c.
20 kg—44 lbs.	1200 c.c.
60 kg—132 lbs.	3600 c.c.
80 kg—176 lbs.	4800 c.c.

The volumes cannot be really looked upon as a reserve of fluid, since beyond the first few hundred cubic centimeters they are given up with increasing reluctance and to the detriment of the whole organism. For children the relatively small amount of fluid that represents the six per cent of the body weight probably accounts for the rapidity with which, under adverse conditions, they become sick and dehydrated.

When water was again given to our experimental subjects the urine volume did not immediately increase, but nearly all of the first day's water was retained to replace the body fluid previously lost. It was perfectly apparent that the major need for water was to restore to normal some of the internal chemistry that had been upset during the dehydration period. Water to relieve dehydration, the same as water for vaporization, seemed to be a "preferential process" over water for kidney function, and it was only when the former had been cared for that sufficient water became available to the kidneys.

A calculation, then, of the amount of water to be given during the first 24 hours to a 60 kg patient who shows the beginning signs of serious dehydration would be as follows:

1. Water for vaporization	2000 c.c.
2. Water for urine	1500 c.c.
3. Abnormal loss, if any, during the 24 hours.....	
4. Water to restore depleted fluids	
6% of 60 kg.	3600 c.c.
Total	7100 c.c.

This is a lot of water but studies by us on several dehydrated patients have shown that such quantities are necessary to provide water for kidney function. Of course, once the depleted fluids have been taken care of, much less water is necessary to maintain normal fluid exchange.

Parenteral Fluids

So far, the quantity of fluid to be given parenterally in order to maintain body fluids or treat dehydration has been considered. The kind of fluid to give also merits discussion.

Recently the reasons for the use of parenteral fluids in 100 general surgical patients at the University Hospital were analyzed. It was found that in 80 per cent of the cases such fluid was given simply because through the disease or treatment the patient was unable to take sufficient water and food by mouth to maintain a normal balance. These patients had not been vomiting and had not lost sodium chloride. What they needed was water and sufficient dextrose to prevent ketosis. This can be supplied best by a solution of five per cent dextrose in distilled water. The dextrose is rapidly oxidized and the water is left available for all purposes. There is no reason to give a salt solution in such instances and some harm possible, since with excess sodium chloride edema will develop in some patients. This is not an idle warning. In a recent study of the water exchange of thirteen sick surgical patients receiving saline solutions intravenously, twelve of them retained appreciable amounts of water, one developing gross edema of the ankles.

Twenty per cent of the 100 analyzed cases had been vomiting and needed some sodium chloride besides water and dextrose. Physiological saline solution or Ringer's solution is needed here, but not too much of it. Patients with a considerable loss of gastro-intestinal secretion should have a blood chloride and a carbon-dioxide combining power study done to show the depletion of chloride and sodium ions respectively. These studies should be repeated every two days while the salt solution is being given, so that it can be stopped when these electrolytes are up to normal. Since the loss of one of these electrolytes is usually greater than the other and the replacement of one is therefore needed more than the other—chlorides in alkalosis and sodium in acidosis—it is desirable to alternate the saline solution liter for liter with five per cent dextrose in water during the correction period. This provides an immediate excess of water, and with this the kidneys can

generally be relied upon to excrete the less needed electrolyte. Alkalosis and acidosis can thus be taken care of with the same solutions.

When the loss of electrolytes, as by vomiting, has been only moderate and blood chemistry studies are not considered to be needed, it is a satisfactory procedure to give parenterally an amount of physiological saline or Ringer's solution equal to the amount of vomitus. The concentration of sodium chloride in these salt solutions is always greater than that in the vomitus or other gastro-intestinal tract secretion. With such a plan the electrolyte loss is well taken care of, and the mistake of giving close to 30 gm. of sodium chloride (the amount present in 3500 c.c. of physiological saline or Ringer's solution) to cover the 5 gm. loss of this material in a liter of vomitus is avoided.

In preparing the intravenous solutions under discussion it is preferable not to make up the dextrose solution with physiological saline or Ringer's solution, since its use always entails the giving of sodium chloride whether it is needed or not. To provide water and food, and this is what most of the patients need, reliance should be placed on 5 per cent dextrose in distilled water. A salt solution, probably best as Ringer's solution, should only be used when sodium chloride is needed.

Concerning the rate of administration of intravenous fluids, in our hands a flow of not faster than 500 c.c. per hour has been satisfactory. The possibility of overloading the heart with such a rate is negligible. The intravenous method, using a 700 c.c. containing bottle and a drip tube, has been preferable to subcutaneous infusions of parenteral fluid. With a little thought for the comfort of the patient intravenous fluid can be administered during the day, and night-time left undisturbed for rest and sleep.

There are many questions on water exchange and parenteral fluids that have not been answered in this paper. I have presented material on only a few of them. There is no doubt but that a quantitative consideration of the water balance of the sick surgical patient is an important part of pre- and post-operative care, and its skillful handling makes for successful results rather than failures.

CYSTICERCOSIS OF THE CENTRAL NERVOUS SYSTEM*

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OF THE platyhelminthes, *tenia solium*, the pork tapeworm, is of the greatest interest to the neurologist because of its faculty for invading the central nervous system in the vesicular stage. The chief host of the larva or *cysticercus* of *tenia solium* (*cysticercus cellulosæ*) is the pig. However, in estimating the clinical importance of the pork tapeworm, we must recall that man may harbor not only the adult worm, but also the larvæ, which readily reach the human digestive tract in drinking water, upon unwashed vegetables and in food contaminated in its preparation. These larvæ then spread throughout the body and thus endanger the life of the host. The *cysticerci*, given an opportunity, develop rapidly in man, involving muscles of the face, tongue, neck, breast, back, abdomen, diaphragm, and of the extremities, the pancreas, the spleen, the kidneys, the lungs, the larynx, the pleura, the heart, the liver, and the brain (Jacobsohn,¹⁷ Hebold,¹⁴ Delore and Bonhomme⁴). They seem to have a predilection for the nervous system where they are found in the meninges, in the ventricles and within the substance of the brain itself. The extensive dissemination through the central nervous system produces confusing clinical pictures and renders the correct clinical diagnosis very difficult.

Due to the improvement in sanitation and hygiene, cases of infestation by the *tenia* larva have diminished in number until at present they have become, especially in this country, what amounts to a medical curiosity. Cases of cerebral involvement are particularly rare. Since these cases do present an interesting diagnostic problem, a report of such a case together with a review of the literature of cysticercosis of the nervous system seems warranted.

The first cases of cerebral infestation with *cysticercus cellulosæ* were reported by Virchow³³ in 1860. He studied two cases in which the vesicles invaded not only the meninges but also the brain substance. The author was in doubt, however, whether they were parasitic or neo-

plastic in origin. In 1882 Zencker firmly established the parasitic origin of these cysts by finding the larval embryo and comparing them with the adult scolex. Since that time numerous cases of central nervous system involvement by the *cysticercus* have been reported (Delore and Bonhomme,⁴ Marchand,²³ Guillian, Bertrand and Thurel,¹¹ Chotzen,³ Kocher,¹⁹ Kufs,²⁰ Mennicke,²⁴ Schob,³⁵ Klob,¹⁸ Schütz,³⁶ Schenk,³⁴ Fischer,⁸ Pförringer,²⁸ Merkel,²⁵ and others).

Ferber⁷ in 1862 reported twelve cases. Of these, six showed no symptoms of epilepsy, while the rest had signs of a diffuse encephalitic process or of cerebral irritation.

Sato³³ collected all the cases of *cysticercus* infection of the brain published up to 1914. He found 128 to which he added four of his own. He found that 76 per cent of the cases were in men and that two-thirds of them occurred between the ages of forty and sixty years. In nineteen there were no symptoms at all suggestive of the infestation.

Bollinger² in 1888 and Hammer¹² in 1889 each reported a series of cases in which no neurological findings suggesting *cysticercus* infection were present.

Wollenberg⁴² in 1905 reported six cases varying in age from twenty-five to fifty-eight years. In no case were larval heads found within the vesicle. Diagnosis in each case was made at postmortem.

MacArthur²² published a report in 1934 in which he observed that many cases of epilepsy among English soldiers were evidently due to cysticercosis of the brain. Of seventy-one such cases collected from English Army records by Dixon and Smithers⁵ over a period of forty years, sixty-five were in soldiers, two in wives of soldiers, one in a sailor, and three in children of soldiers. Most of the soldiers had been infected in India.

In most cases of cysticercosis, the diagnosis is not made until autopsy. Occasionally, however, cyst walls are obtained through a spinal needle, revealing the nature of the infection. Hart-

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mann¹³ and Stertz³⁷ both obtained such membranes during routine spinal puncture and were able to make a clinical diagnosis of cysticercus infection of the central nervous system. We also were fortunate to obtain cyst pellicles from the spinal fluid which aided us in making the clinical diagnosis in the present case.

A few cases of cysticercosis have been reported in which the spinal cord or cerebellum have been involved (Geelvink,⁹ Richter,³⁰ Westphal,⁴⁰ Hirt,¹⁶ Meyer,²⁶ Henneberg,¹⁵ Rosenblath,³¹ Redalie²⁹).

Wilhelm⁴¹ in 1867 and Hebold¹⁴ in 1884 each published cases in which the cysticercus infection had extended into the tissues of the cerebellum. In neither were definite clinical signs of cerebellar involvement present.

Most of the cases of cysticercosis of the nervous system have been reported in foreign languages, only a few being found in English (Dixon and Smithers,⁵ MacArthur,²² Luney,²¹ Walton,³⁹ and Dolgopol and Neustaedter⁶). Because of the paucity of reports of this interesting condition in the American literature, and particularly because a clinical diagnosis was made in this case antemortem, a review of our case seems permissible.

Case Report

Mrs. S. V., aged thirty-nine, was admitted to the Minnesota General Hospital on April 26, 1935. Unfortunately the clinical history is lacking in many details, since the patient was brought to the hospital in an advanced stage of the disease and was not able to cooperate or answer questions. This history was obtained from the husband, who had been acquainted with the patient for only thirteen years. At the time he first met her, he says she had some difficulty in walking, moving about with a peculiar unsteady and shuffling gait although she had no difficulty in walking in the dark. Her memory at this time was very poor and she would forget what was told her quite promptly.

In 1929, the patient was slightly injured in an automobile accident, and from that time on she complained of transient attacks of stiff neck.

In 1930, after working all day in the garden, she suffered an attack of weakness, dizziness, and respiratory difficulty, associated with headaches. She was put to bed, where she remained for seven weeks. It is not known whether she had any attacks of unconsciousness at this time. Shortly after recovering from this prolonged spell, she began to complain of blurring of vision and generalized headaches. The headaches gradually increased in severity and duration until they would persist for hours and could not be relieved by any type of medication. The stiffness of her neck also

became more marked. At about this time (five years ago), the patient began to have attacks of weakness of her extremities. Her knees seemed to give way, and she would have to lie down. She continued to do her housework and care for her children, in spite of numerous such attacks. These attacks were characterized by a definite sequence of events. They were described by the husband as follows: At the onset she developed a stiff neck followed by weakness of the extremities. She fell if she did not lie down at once. There then developed severe generalized headache with projectile vomiting and finally she lost consciousness. No convulsions occurred, the patient being flaccid. These attacks varied in their frequency, occurring at first at intervals of two months, but finally increasing to once every week.

On November 18, 1933, she visited a clinic complaining of severe frontal headache and blurring of vision. At this time her blood chemistry was normal, but she ran a definite leukocytosis. Physical examination revealed numerous large polypi in her nose. These were removed. Examination of her fundi revealed a blurring of the right disc.

The attacks continued and the patient's vision decreased very rapidly until she could no longer read. She was examined at another clinic on October 15, 1934. At this time the physical examination was essentially negative. Her blood pressure was 144/90. Fundus examination showed discs of light color, the right rather pale temporally. Laboratory tests were essentially negative. X-rays of the head showed the sella enlarged and deepened, and scattered miliary calcified areas over both sides. After a complete neurologic examination a diagnosis of a diffuse encephalitis with mental deterioration and Jacksonian epilepsy was made.

From this time until the time of admission to the hospital she went downhill. She became totally blind, disoriented, developed paralysis of her extremities, and finally lapsed into a semi-stuporous condition.

On admission April 26, 1935, complete examination was absolutely impossible, since the patient cried out with pain on the slightest movement and would not cooperate. Her pupils were equal and reacted sluggishly to light. It was impossible to test visual fields. Ophthalmoscopic examination revealed bilateral choked discs measuring from three to four diopters. There was one hemorrhage about three disc diameters to the nasal side of the left disc. The examination of the rest of the cranial nerves was indefinite. The chest and abdomen were entirely normal. The deep reflexes were normal in all the extremities. The abdominal reflexes were normal, as were also the Babinski sign. Her neck was very stiff. It was impossible to test coordination or sensation because of the inability of the patient to cooperate.

Laboratory studies revealed a 77 per cent hemoglobin, 15,000 leukocytes, of which 87 per cent were polymorphonuclears and 13 per cent lymphocytes. The urine examination was normal. Urea nitrogen and fasting blood sugar were also normal. The blood Wassermann was negative on two occasions.

During her stay in the hospital she lay very quietly and resisted any attempt to turn her head or move her extremities. Her neck was very rigid, and the Kernig's sign was positive bilaterally. Her deep reflexes became reduced and she developed bilaterally



Fig. 1. X-ray of skull. Note the sharply demarcated calcified nodules scattered throughout the brain substance.

positive Babinski signs. One was occasionally able to penetrate the patient's sensorium with simple commands.

Neurological examination two weeks after admission revealed many changes. The choked discs had disappeared and were replaced by optic atrophy. The deep reflexes in the upper extremities were present but reduced, while those in the lower limbs were entirely absent. No abdominal reflexes were obtained, and the Babinski sign was positive only on the right side. Her neck still was very stiff.

The patient during this entire time had urinary incontinence and she developed a large decubitus over the sacrum. Repeated spinal drainages were performed in an attempt to relieve the intracranial pressure. Under this treatment the patient seemed to improve slightly and responded somewhat to questioning. Examination at this time showed intact superficial and deep sensation, good coördination in performing the finger-to-finger and finger-to-nose tests, and normal cranial nerves with the exception of the visual loss.

In spite of the continued spinal drainages the patient again lapsed into a stuporous state. Her decubitus ulcers failed to respond to treatment and she developed new areas of necrosis on the slightest pressure. Her temperature, which was normal on admission, rose gradually to 103° F. and the pulse to 120. She expired after a hospital stay of forty-eight days.

X-ray studies were made of her skull shortly after her admission to the hospital. These showed multiple

calcified densities scattered diffusely throughout the brain (Fig. 1). No evidence of calcification of abnormal character was observed in any of the extremities. The significance of these X-ray findings was not at first appreciated.

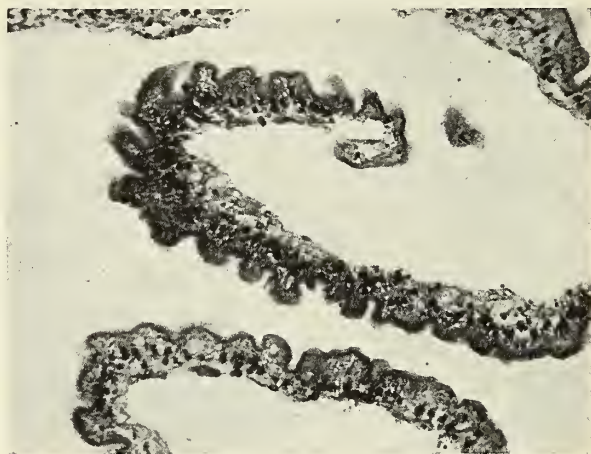


Fig. 2. Histologic section through a cyst wall showing its division into three layers. The cuticle is quite definite and thrown into numerous papillary folds. The inner two layers are not so clear cut. The parenchymatous layer contains the numerous nuclei, while the innermost reticular layer consists of loose connective tissue.

Shortly after her admission, a spinal tap was performed. Upon removing the stylet from the needle a few drops of cloudy fluid were obtained. The stylet was re-inserted and again removed. A sudden gush of cloudy fluid occurred which again stopped suddenly. The stylet was again inserted and removed, and each time a gush of spinal fluid resulted. During one of these sudden gushes of spinal fluid, a thin translucent whitish membrane floated out of the needle into the spinal fluid where it opened to reveal an almost intact vesicle. Histologic studies of this pellicle revealed a definite cyst wall (Fig. 2). It was the combination of the x-ray findings of the skull plus the peculiar cyst walls in the spinal fluid that led us to the diagnosis of cysticercus infection of the central nervous system, although cysticercosis was offered as a probable explanation of the x-ray picture before the spinal tap. Many large cysts and fragments of cysts were obtained in the frequent spinal taps (Fig. 3a). These were identified as the walls of the cysticercus of the pork tapeworm by Dr. W. A. Riley, Professor of Entomology and Economic Zoology at the University of Minnesota. We would like to acknowledge the kind assistance and stimulating interest of Dr. Riley in this study.

The cell count in the spinal fluid varied from 65 to 8,800 leukocytes, the majority being polymorphonuclears. The spinal sugar varied from 8 to 78 mg. per cent, and the protein from 40 to 125 mg. per cent. Serologic tests for syphilis on the spinal fluid were inconsistent. At no time were eosinophiles found in the spinal fluid, although as high as 6 per cent eosino-

philes were observed on routine blood studies. Examinations of the patient's stool for tapeworm or ova were repeatedly negative.

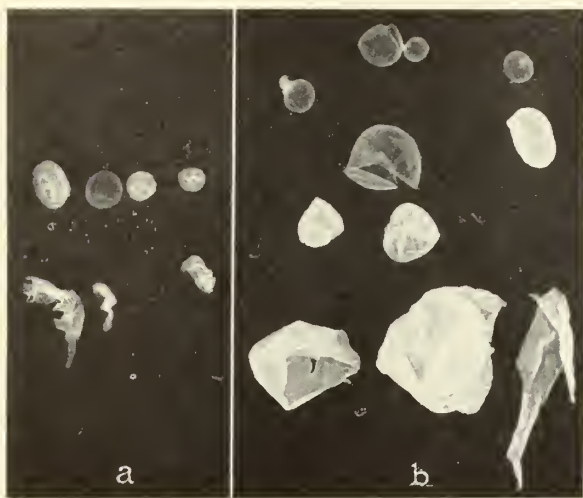


Fig. 3. (a) Cyst walls obtained through the spinal needle. Note the variation in size. (b) Cyst walls obtained at post-mortem from the ventricles. They resemble quite closely those obtained by spinal puncture. In the upper part of figure are two cysts from which daughter cysts have budded off.

Autopsy Studies

The postmortem study revealed a well developed white female weighing about 135 pounds. There were multiple decubitus ulcers: one on the lateral aspect of the left heel, 1 cm. in diameter; one on the crest of the left ileum, 2 cm. in diameter; in the region of the left greater trochanter, one 3 cm. in diameter; and one over the sacrum, measuring 7x4 cm.

The peritoneal, pleural and pericardial cavities were all normal. There was a slight amount of patchy consolidation of the left lower lobe and of the right upper and lower lobes of the lungs.

The gastro-intestinal tract was normal.

The rest of the organs with the exception of the central nervous system were negative both grossly and microscopically.

The scalp and calvarium were normal. On removal of the skull, the dura was found to be quite tense. The anterior surface of the brain was lifted upward in order to expose the tentorium. The temporal lobes were adherent to the lesser wing of the sphenoid by soft easily separated adhesions. The floor of the third ventricle bulged downward and was adherent to the sella turcica. In an attempt to separate these structures, the floor was torn and a large amount of turbid fluid gushed forth, filling the skull and running over upon the table, revealing that a marked hydrocephalus was present. This turbid fluid contained many cysts of varying size and shape (Fig. 3b). Some were smooth walled, transparent, and contained a clear, watery fluid, while others were thicker walled and yellowish, and were filled with somewhat gelatinous material. Most of the vesicles were single, but many contained numerous outpouchings, the so-called daugh-

ter cysts, connected to the main vesicle by fine thread-like processes. It was because of this grape-like appearance of the daughter cysts that the name, "cysti-

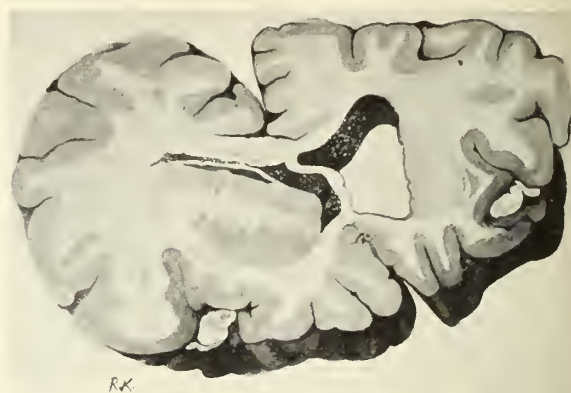


Fig. 4. Drawing showing a coronal section through the brain. Note the granular appearance of the ependyma, the dilatation of the ventricles, the softening of the corpus callosum, and the large calcified cysticerci in both sylvian fissures.

cercus racemosus," was suggested for this condition by earlier workers. None of the cysts contained larval scolices although many did present a tiny rounded yellowish nodule on their inner surface, probably the rudiment of a previously existing head. The vesicles were of the same gross appearance as those obtained through spinal drainage.

On removal of the brain, an extensive soft opaque membrane was found covering its entire base. The membrane extended anteriorly to the under surface of the frontal lobes involving the optic nerve and chiasm as well as the internal carotid arteries. The membrane also covered part of the temporal lobes. It extended along the middle cerebral artery deep into the Sylvian fissure, the temporal and frontal lobes being firmly bound together. Posteriorly the membrane covered the inferior surface of the occipital lobes, extending to the cerebellum, and to the pons, where it enmeshed the basilar artery and its branches. It also extended down the medulla into the spinal cord. Besides the imbedded nerves and vessels, the membrane contained many smooth elongated strands which appeared as whitish membranes or as compact yellowish masses. These whitish membranes represent cyst walls that have become compressed and incorporated in the thickened membrane. It seems that well developed, well shaped cysts are found only free in the ventricular system, while those in the membranes and brain tissue are compressed and deformed.

In the posterior portion of the left middle frontal convolution was a depressed area in the brain measuring 2x2 cm. and filled with a large multilocular cyst. This cyst was yellowish in color and contained cloudy material. Most of the cyst separated easily from the cerebral depression, being attached only by a long thread to the anterior part of the cavity. The cyst histologically revealed the typical structure of a cysticercus vesicle wall. In one region of the vesicle there was a large calcified nodule evidently representing the orig-

inal scolex. The cerebral cortex directly underlying the cyst was compressed.

On the medial aspect of the left cerebral hemisphere in the lobulus paracentralis there was a small calcified nodule situated within the brain substance but extending to the surface. This nodule measured 3x4 mm. and on cut section was found to extend 4 mm. into the brain tissue. A similar nodule was found in the right inferior frontal convolution.

Coronal sections a few millimeters in thickness were made of the entire brain. The sections revealed a marked internal hydrocephalus involving all the ventricles, the block evidently being due to occlusion of the foramina of Luschka and Magendie by the thickened membrane. The lateral ventricles were equally distended and their anterior and posterior horns reached nearly to the surface of the brain. The third ventricle was enlarged to almost three times its normal size. The distention caused marked thinning out of its floor.

The ependyma lining all the ventricles was thickened, granular, and softened (Fig. 4). Its inner surface was covered by a uniform layer of tiny velvety tubercle-like projections. In some regions, the thickened ependyma was completely freed revealing the glistening surface of the underlying brain tissue. The choroid plexus was thickened and covered by numerous tiny clear-walled cysts. Many tiny specks of calcification were scattered throughout the plexus. No free cysts were found within the ventricular system, these apparently having escaped during the removal of the brain.

The white substance of the left cerebral hemisphere was much softer than that of the right. This softening was scattered throughout the hemisphere, but was most marked in the basal ganglia and the subthalamic region, extending to involve the mammillary body and the infundibular areas. The corpus callosum on the left side was also softened, edematous, and boggy in appearance (Fig. 4). This peculiar change was most marked in the region of the body of the corpus callosum and merged into normal tissue as one approached the splenium. This edema was not restricted to the corpus callosum, but extended into the gyrus cinguli, apparently obliterating the sulcus. In the motor regions, the brain tissue again assumed a normal appearance. Histologically the extensive gross changes in the left hemisphere and in the corpus callosum showed surprisingly little. The microscopic appearance was that of an intensive edema with separation of the brain tissue by clear spaces and by large spaces around the blood vessels. There was no evidence of tissue destruction or of a cellular reaction which might be considered indicative of an inflammatory or reparative process. The cerebral cortex was uninvolved.

Calcified or partly calcified nodules were observed scattered throughout the brain and meninges. There seemed to be no predilection for any particular region since they were found in the basal ganglia, the internal capsule, the hypothalamic region, and throughout the various parts of the cortex, the white substance, and the cranial meninges. None were seen in the pons, the medulla, or in the cerebellum. The nodules varied in

size from a few millimeters to over one centimeter in diameter. Most of those in the brain substance appeared to be single, while those in the meninges were



Fig. 5. Photograph of the spinal cord. Note the large number of flattened cysticerci vesicles situated all along the cord and extending with the spinal nerves through the dura. Two of the swollen hemorrhagic spinal ganglia can be seen.

frequently multiple and clumped. Occasional nodules were observed which had extended from the meninges into the brain substance and had involved both tissues.

In the brain, the cortex and white substance were about equally involved. The meningeal nodules were most frequent in the region of the Sylvian fissures, and around the optic nerve and the optic chiasm. The Sylvian fissures were widened throughout their extent and filled with a thickened membrane in which numerous nodules were imbedded, as many as ten being counted in a single section. In the anterior part of the Sylvian fissure just below pars triangularis of the inferior frontal gyrus, were two large nodules, each measuring fully one centimeter in diameter (Fig. 4). These were firmly imbedded in the thickened meninges.

All the meningeal nodules were surrounded by a dense layer of connective tissue. Many displaced or indented the underlying brain substance. The nodules differed in consistency, some being hard and gritty while others were soft and almost fleshy. They varied in color from deep yellow to pearly white, the latter being the hardest. Most of the nodules had a lamellated appearance. The softer yellowish ones appeared stringy in the center and were surrounded by spongy

whitish tissue. All were enveloped either by a firm meningeal layer or by a thin zone of cerebral tissue. There was no softening of brain tissue observed about any of the nodules.

In the meninges, the numerous vessels in the neighborhood of the nodules appeared uninvolved unless the vessel passed through the hyalinized mass, as, for example, did the middle cerebral on the left side.

The spinal cord grossly presented irregular thickening of the leptomeninges, more marked on its posterior surface. Attached to the inner surface of this thickened membrane were numerous groups of flattened whitish elongated membranes representing confluent groups of tiny cysts (Fig. 5). These flattened bladder walls were usually situated on the lateral aspect of the cord, and contained many small calcified plaques of varying size. In the region of the thoracic cord the cysticerci vesicles were most extensive. Some covered an area extending over three to four cord segments. An occasional cyst filled with a tiny amount of clear fluid was observed.

The dura separated easily, the subdural space being uninvolved except in the region of exit of the spinal nerves. Almost all of the spinal nerves were surrounded by prolongations of the parasitic vesicles which followed the nerves as they passed through the subdural space to the spinal ganglia. Most of the ganglia were swollen to twice normal size and were adherent to the surrounding tissue (Fig. 5).

When the subarachnoid space was exposed, numerous small intact vesicles with transparent walls were observed floating free in the subarachnoid fluid. This probably was the source of the cysts obtained on spinal drainage. Many cysts were found in the region of the cauda equina.

The cord itself, especially on its anterior aspect, presented three areas of enlargement and softening. The first involved an area from the fourth to the sixth thoracic cord level. Grossly the cord on cut section appeared softened and edematous. The normal cord arrangement was entirely destroyed. The second enlargement was at the tenth thoracic level. Here the swelling was one centimeter in length and the tissues were not as soft as in the upper lesion. The normal arrangement of cord substance was only partially wiped out. One was still able to identify the white from the grey substance. The lowest of the cord bulgings was in the region of the first lumbar segment, where multiple tiny nodules protruded from the cord surface. The tissue throughout this region was soft but not necrotic.

Histological Studies

Meninges.—The membrane at the base of the brain varied greatly in thickness in various regions, being greatest in the Sylvian fissure and in the region of the Gasserian ganglion. Here it was very cellular and fibrous, while in other regions it was thin and contained few cells. The membrane was composed of a meshwork of loose connective tissue fibers containing numerous elongated spindle-shaped cells whose processes gradually merged with the surrounding tissue. These cells contained vesicular nuclei with clumped chroma-

tin particles. In most regions this connective tissue, which seemed to form the framework of the membrane, was quite loose, having an almost reticular appearance. Interspersed within this connective tissue membrane were many cells of a mononuclear type consisting of lymphocytes, monocytes, plasma cells, and occasional giant cells. As a rule the cellular element was not prominent, but in certain regions, especially around the large vessels and in the Sylvian fissure, the cells were so numerous that the intercellular tissue could not be made out.

In some regions small clumps of red blood cells were observed within the membrane. In the Sylvian fissure, there were numerous phagocytes filled with dark brown particles, evidently hemosiderin granules from phagocytosed red cells.

The membrane also contained large hyalinized and calcified masses. These represented parts of cysticerci and will be discussed presently.

Structure of the Cysticercus Membrane.—Histologically the structure of the walls of the cysts found lying free in the subarachnoid space was quite consistent. These vesicle walls contained two or three layers. The outermost or cuticular layer consisted of a well demarcated homogeneous structure presenting numerous blunt papillary elevations which resembled roughly the elastica interna of a large muscular artery (Fig. 2).

The rest of the cyst wall consisted of a meshwork of thin fibers forming a plexus-like arrangement. Most authors describe this inner layer as consisting of two separate strata with indistinct boundaries. The middle layer (parenchymatous layer) consisted, therefore, of a groundwork of loose connective tissue which penetrated into the papillae formed by the folds of the cuticle. The inner surface of this indefinite middle layer contained a fairly uniform row of thickly placed small dark cells (Fig. 2). This parenchymatous layer gradually merged with the innermost or reticular layer, which consisted of a loose network of interlacing fibers, and contained only an occasional cell.

In some cysts there occurred a proliferation of the cells of the parenchymatous layer to form a large clump or nodule of cells. The proliferating cells invaded and replaced the reticular tissue and penetrated the bladder lumen. Apparently this represented the remnants of a degenerating scolex or early arrested formation of the scolex.

In many of the larger cysts, the papillae enlarged and became constricted off to form smaller daughter vesicles which remained attached to the original cyst, resulting in a racemose appearance, hence the name *cysticercus racemosus*.

Structure of Cysticerci Within Brain or Meninges.—The cysticerci enmeshed in meninges or located within the brain tissue had a different appearance from those lying free in the ventricular system. They seemed to have become altered due to compression and degeneration.

The cysticerci within the meninges were all hyalinized; in none was any structure of the scolex discernible. Numerous calcium particles were deposited in certain areas of the hyalinized mass and probably represented the calcified scolex, which usually is the first structure



Fig. 6. Histologic section of a calcified cysticercus situated within the Sylvian fissure. No structural details can be made out. There is a dense connective tissue wall surrounding the parasite. The vessels within the vicinity are normal.

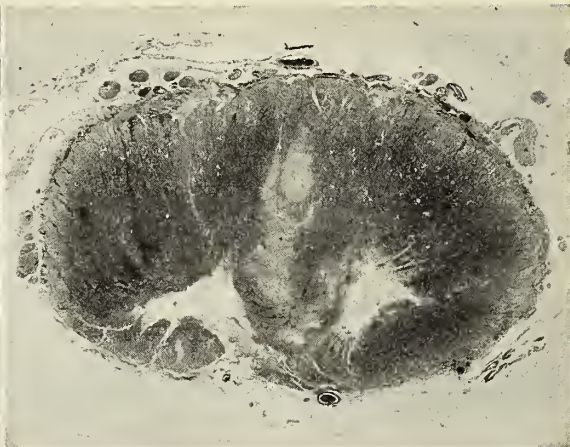


Fig. 7. Section through the thoracic cord. Note the large cavities replacing most of the anterior horns. There is a partial destruction of the medial portion of the posterior horns.

to undergo degeneration. The cyst walls were completely hyalinized (Fig. 6). Surrounding this hyalinized bladder-wall was a dense wide layer of collagenous connective tissue. No cells were present within this tissue although an occasional small nucleus was observed. In a few instances there were patchy areas of hyaline degeneration within this fibrous tissue. Surrounding this latter layer there was a much looser layer of connective tissue filled with numerous mononuclear cells and many blood vessels. This loose connective tissue usually merged with the elements of the surrounding membrane. Around those nodules that were in contact with the brain, a thin layer of glia tended to accumulate on the border of the nodule, thus forming still another layer outside of the loose cellular connective tissue.

Many parasites that had invaded the brain substance had capsules similar to those in the meninges. Others, however, were not surrounded by layers number three and four. These degenerating cysticerci were covered only by a thick layer of glia containing few or no cell nuclei.

Vessel Changes.—Contrary to the findings of numerous authors, the vessels within the brain and meninges showed little or no changes, regardless of whether they were in contact with a degenerating cysticercus or not. A few small vessels within the meninges showed in their adventitia numerous round cells. The intima and media were not involved. With the exception of the middle cerebral artery, all the large arteries at the base of the brain were normal in structure. The middle cerebral artery as it lay in the Sylvian fissure was firmly imbedded in the inflammatory membrane described above, and was in contact with a hyalinized cysticercus. This vessel showed a uniform thickening of the intima and a definite reduplication of the elastica interna. Between the two layers of elastic tissue there was a large amount of muscle and connective tissue fibers. The adventitia showed a moderate increase in its collagenous fibers which gradually faded out into the surrounding tis-

sues. The intracerebral vessels showed no change.

Askanazy¹ was the first to describe the vessel changes in cysticercus meningitis. He concluded that the large vessels at the base of the brain were mostly involved. Goldstein¹⁰ described the vessel changes as of two types: in the first there occurred a massive non-cellular thickening of the intima with a reduplication of the elastica and an invasion of the adventitia by numerous cells. In the second type of change there occurs an invasion of the intima by numerous cells, while the adventitia is thickened and only moderately invaded by cells. Numerous other vessel alterations have been reported, such as medial thickening, vessel wall necrosis, reduplication of the elastica interna, fragmentation of the elastic interna, destruction or thinning out of the medial musculature, replacement of the media by collagenous fibers, etc. The lack of these changes in our case, that of a fairly young individual, makes one wonder whether most of the vessel alterations reported may not have been due to the age of the patient and not to the specific invasion of the cysticercus cellulosæ. All of these changes may occur as age changes in cerebral vessels.

Ependymal Changes.—The ependyma lining all the ventricles showed a granular ependymitis (Fig. 4). It showed a peculiar nodular appearance on gross examination. Histologically the ependymal surfaces contain numerous nodular elevations consisting of dense masses of glial tissue (Fig. 7). The fibers within these nodules merge with the underlying brain tissue from which they appear to arise. They are relatively poor in nuclei and stain somewhat deeper than the surrounding brain tissue. In most cases there was no ependymal lining over the nodules, although occasionally the epithelium did extend part way up their sides.

Cord Changes.—In studying the cord, sections were taken from the cervical, mid-thoracic, and lumbar regions.

The cervical cord showed no striking pathologic changes. The nerve rootlets were normal. The cord was surrounded by an inflammatory membrane consist-

ing of numerous mononuclear cells, many of which possessed a large amount of granular cytoplasm. Within this membrane covering the posterior surface of the cord was a partly degenerated elongated cyst filled with necrotic caseous material. The vessels within the meninges were not involved in spite of the surrounding inflammatory tissue.

The thoracic cord showed much more extensive changes. In its anterior portion, replacing most of the anterior horns and also some of the surrounding cord tissue, were two large, triangular, rather symmetrical cavities (Fig. 6). An occasional nerve cell could be seen in the remains of the anterior horns. The cells in Clark's columns were present but showed complete chromatolysis and beginning shrinkage of the cell bodies. There was extensive demyelination of the medial portions of the posterior columns and of the entire anterior columns. The rootlets, both anterior and posterior, were intact. There was a meningitis here similar to that at higher cord levels. The inflammation was most extensive on the anterior surface of the cord.

The upper lumbar segments showed partial replacement of the right anterior horn by a small cavity. Evidently this cavity had dissected down from the higher levels. It did not reach as far on the left, leaving the left anterior horns quite intact in the lumbar cord. The anterior horn cells still present were of normal size and shape, but showed partial chromatolysis. No myelin sheath changes were seen. The meningitis was very severe in the lumbar cord, especially on its posterior surface, where the inflammatory membrane surrounded the rootlets and even invaded the perineural tissue. The nerve fibers were, however, not involved. On the anterior aspect of the cord, there was a large hyalinized vesicle which was loosely attached to the meninges.

The lower lumbar segments showed moderate demyelination of the posterior columns, the rest of the cord being intact. The rootlets showed a moderate proliferation of the Schwann cells. Most of the nerve fibrils were still intact. The meningitis here was slight.

Discussion

On reviewing the pathological involvement in our case and the various other cases in the literature, it is readily apparent that no single clinical picture can be expected in cysticercosis of the central nervous system. The widespread basilar meningitis, the high grade internal hydrocephalus, the softened areas in the brain and cord, the extensive invasion of the brain substance by vesicles, all contribute to the diversity and variability of clinical manifestations. Many cerebral cysticerci never show symptoms and are discovered only at autopsy (Jacobsohn,¹⁷ Ferber,⁷ Hammer.¹² In other cases the involvement manifests itself chiefly as a meningitis with severe headache, stiff neck, vomiting, some cranial

nerve involvement, and pain upon extension of the extremities. But as a rule the clinical picture is kaleidoscopic, varying with the manner and intensity of the cysticercus invasion, the rapidity of invasion, and the changes in the neighboring tissues. The symptoms reported have varied from generalized signs of increased intracranial pressure, such as headaches, vomiting, diplopia, visual disturbances, and vertigo, to more marked disturbances such as sudden blindness, paresthesias of the face and body, paresis, urinary and rectal incontinence, epileptiform seizures, hallucinations, delirium, and loss of consciousness. Sudden and complete blindness is claimed by Rosenblath to be quite characteristic of this involvement. The extreme difficulty that faces the neurologist in arriving at a clinical diagnosis of such a case is readily apparent in reviewing the various diagnoses made antemortem in the cases reported in the literature. These include presenile psychosis, cerebral neoplasms of all locations, idiopathic epilepsy, encephalitis, luetic meningitis, tuberculous meningitis, and many more. There often occurs, as a result of the extensive cerebral damage, a non-specific positive Wassermann reaction, which merely adds to the confusion.

It is apparent, therefore, that because of the diversity of symptoms, the neurologist usually cannot make a definite clinical diagnosis, beyond establishing the presence of an organic disease of the brain and meninges. In such cases he is then forced to seek carefully for some other aid, either technical or laboratory, that might help in arriving at the correct diagnosis. In cysticercus involvement of the nervous system there are several such aids, which when considered with the clinical picture of a rather indefinite but diffuse type of meningo-encephalitis should frequently lead to a correct diagnosis of cysticercus infection. These aids are as follows:

1. *The occurrence of cysticerci in the skin, the muscles, or in the eye.* Worms inhabiting the cutis can frequently be felt beneath the skin as freely movable nodules about the size of a pea. These cysts vary widely in a number of different cases and also in the same case from time to time. When the cysts become calcified, they often remain indefinitely as small, hard nodules. These cysts may be detected in the subcutaneous tissues and muscles of any part of the body, more especially of the head and face, lips, trunk

and limbs; the hands and feet usually escape. These nodules may be biopsied in order to verify the diagnosis. When the vesicles become calcified they may be seen upon x-ray examination of the limbs.

The bladder-worm is often found within the anterior chamber of the eyes, where it produces impairment of vision and irritation of the iris. Usually the parasites occur singly within the eye and can be detected by careful ophthalmoscopic examination. Cysticerci of the eye have been followed over a period of twenty years.

2. *X-ray studies of the skull.*—The parasites may invade the body in large numbers and yet give no outward evidence of their presence until years later when they calcify and are discovered, often accidentally, by radiological examination. Calcification occurs only later, after the death of the parasite, hence the radiologic confirmation or help is unlikely during the early period of the infection. In the brain, calcification of cysticerci is much slower and less frequent than elsewhere, so that a negative radiogram of the skull in the presence of cysticercosis is common. However, when skull plates reveal diffuse mottling of the brain with small areas of calcification, a diagnosis of cysticercus infection must be considered.

3. *Bladder walls in the spinal fluid.*—A fairly uncommon but very convincing aid in the diagnosis of cysticercus infection, is the obtaining of vesicle walls through the spinal puncture needle. Such findings have been obtained by Stertz,³⁷ Hartman,¹³ and by ourselves.

4. *Cyst walls obtained at operation.*—An occasional aid in the diagnosis is afforded by section obtained from the brain at operation. Pfeiffer²⁷ obtained, through a trephine opening, some whitish tissue which proved to be a cysticercus wall.

5. *Eosinophilia in the blood and spinal fluid.*—In any case that presents a picture of an atypical meningo-encephalitis, the presence of eosinophilia in the blood or in the spinal fluid should make one suspicious of a cysticercus infection. It is true that eosinophilia may be encountered in a number of allergic somatic diseases which must be excluded. Often, in cases of long standing, there may be no eosinophilia. Nevertheless, both the blood and spinal fluid should always be carefully examined for eosinophiles. If they are increased, one must consider a parasitic infestation, viz., cysticercosis. Our case showed no

increase in eosinophiles in the spinal fluid, although we did obtain as high as six per cent eosinophiles in the blood.

6. *Proglottides and tapeworm eggs in the stool.*—Every autogenous infection with cysticerci must be preceded by an infestation with the mature tapeworm, parts of which are occasionally found in the stool of these patients, thus aiding materially in the clinical diagnosis. Often, however, years elapse before the cerebral manifestations become noticeable. By this time the original tapeworm infestation may have been cured. The stool examination, therefore, would be negative in most cases, and of little aid in the final diagnosis.

7. *Serologic tests.*—The final aids in the diagnosis are the various serologic tests such as the skin test, the complement fixation test, and the precipitin test. For all of the above tests a specific cysticercus antigen is necessary and this is, unfortunately, often difficult to obtain. We were unable to obtain such an antigen in spite of numerous inquiries. The skin test and complement fixation tests have been used frequently in European countries but give positive results in but fifty per cent of cases of cerebral cysticercosis. Recently Rothfeld³² advocated the precipitation test as a diagnostic procedure. He feels that it is more sensitive than any of the other reactions.

We were indeed fortunate in our study to have numerous of the above aids in helping us establish our clinical diagnosis. After obtaining the symptoms of a diffuse widespread meningo-encephalitis, we received the roentgenologic report of numerous calcified nodules scattered throughout the brain. The report first made us suspect the cysticercus etiology of the involvement. Our suspicions were confirmed when we obtained the pellicles from the spinal fluid and studied them histologically.

Cysticercus infection of the nervous system is a rare condition. When it does occur, the neurologist should be on the watch for this condition, and will need to use all the aids available to assist him in a correct diagnosis.

Summary

1. A case of cysticercosis of the central system presenting the symptomatology of a diffuse meningo-encephalitis is reported. X-ray studies of the skull revealed numerous calcified nodules

scattered through the brain. Numerous cyst walls were obtained on spinal tap. These latter findings materially assisted the clinical diagnosis.

2. Postmortem studies revealed an extensive basilar meningitis with numerous compressed vesicles enmeshed within the membrane covering the brain and cord. Numerous calcified cysticerci were observed within the brain substance and meninges.

3. A brief summary of the literature is given.

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CAUSES, DIAGNOSIS AND TREATMENT OF HAY FEVER*

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AS EARLY as 1829, William Gordon concluded that hay fever was caused by "aroma emitted by flowers of grasses," particularly from sweet vernal grass. Charles H. Blackley, in 1873, furnished the first experimental proof that pollens are the etiologic agents of seasonal hay fever. Its prevalence, in England especially, during the haying season, pointed to grasses as the plants chiefly responsible for the malady (hence the name hay fever), but the notion began to be widespread that many other plants such as roses (rose fever), sweet peas, and goldenrod were involved.

However, William Scheppegrell (1917) was the first one to show that the *only* species of plants involved in the causation of hay fever were those producing wind-borne pollen. That is, such showy plants as roses, goldenrod, et cetera, have insect-carried pollen and are not general causes of hay fever. The importance of Scheppegrell's contribution deserves emphasis, since, when this fact was clearly recognized, it was possible to determine for any region the species concerned, and this led to the making of surveys of hay fever plants in various parts of the world. At the suggestion of several members of the State Board of Health, such a survey was prepared for Minnesota by Dr. Rosendahl. It listed the principal wind-pollinated plants, both native and cultivated, growing in the state, their geographic distribution, prevalence, and the dates of flowering. This survey did not include data as to the concentration of pollen in the air of any species at a given time or locality. For successful diagnosis and treatment of hay fever, such data are necessary and, accordingly, pollen concentration studies were undertaken and have been carried on for four consecutive years. Information has been gathered from eight separate stations within the state and five outside in the upper Mississippi valley. It appears that no more extensive collection of data concerning hay

fever plants, pollens, and treatment has ever been accumulated. Especially is this true as concerns pollen throughout the entire season, for our daily records show the pollen behavior of all groups from March through November.

Methods.—Records of the pollen content of the air have been obtained by exposing an oil-coated microscope slide out of doors for twenty-four hours. Air-carried particles including pollen grains are ever settling, and some of these will adhere to the slide's sticky surface. A slide so exposed is examined with the microscope and the pollen grains observed are recorded as to kind and number of each (about sixty kinds have been found on the slides). The approximate number of pollen grains per cubic yard of air can be calculated from such counts by use of physical formulæ. Simply, these formulæ are based on the obvious fact that more small pollen grains can occupy a cubic yard of air than can large ones. The data are put on such a basis since it gives a measure of the actual conditions to which the patient is exposed—a measure which is of greatest importance in diagnosis and treatment as Dr. Ellis and Dr. Sweetser will shortly point out to you.

Discussion.—Most people realize what pollen grains are when they remember that it is the yellow or brownish substance which "powders" our noses when we smell of fragrant flowers. They are tiny spores which under favorable conditions will germinate and produce the male or sperm cells of the plant. Obviously, wind-borne rather than insect-borne pollen is of greater significance in hay fever. Typical examples of flowers producing air-carried pollen are the oak and the grasses.

Passing on to the statistics, let us consider the critical pollen concentrations of the most important hay fever plants. Time will not permit the review of all pollens present in the air.

The pollen of various trees is first to be present in the air. Soft maple, for example, may begin pollination as early as March 25. While the concentration of tree pollen becomes rather high, it

*Read in symposium on Hay Fever at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, June 4, 1936.

is fortunately true that their pollination season is relatively short. The studies of 1932 and 1933 show that April 23 represents a time when the pollen count is critically high for elm, cottonwood, and box elder; while the records for 1934 and 1935 illustrate how markedly weather conditions can affect the pollen count. Due to an erratically slow and dusty spring, the 1934 peak was delayed about a week, but with rapid increase of temperature the oak trees were encouraged to shed pollen a week earlier than usual (May 7 instead of the middle of the month). The rainy spring of 1935 caused no marked change in pollination dates, but naturally reduced the pollen count to about a third of the normal. Dr. Ellis' data will show which trees are most important from a clinical standpoint.

Grass pollen dominates the air during June and the first part of July. The days between June 5 and 15 are serious ones for persons sensitive to this group. The increasing scarcity of rain from 1932 to 1934 is very clearly reflected in the pollen counts of the grasses. In 1932, the pollen concentration was rather high; in 1933, there was a great decrease, and in 1934, the amount of grass pollen is hardly significant. The count for 1935 is rather striking, since with the reappearance of at least occasional rains we find the grasses recuperating and producing pollen much as they did in 1932 except for the appearance of a tremendously high count on June 13 (about twice as high as any recorded before). This would appear to be a very good reason why certain grass-sensitive patients suffered so markedly (perhaps even for the first time) last season.

The graph for chenopod pollen includes the pigweed group and the Russian thistle group. While there is a general similarity between the pollen counts for the 4 years, certain peculiarities are worthy of note. The period July 25 to September 15 very generally represents the time during which concentrations are seriously high. The 1935 count was of great interest since it showed abnormally high concentration during September—in fact, the peak of pollen production came on September 24. Reference to this fact will be made again in connection with the next group. If we summarize this group by calculating the seasonal totals, we see an interesting phenomenon. The count for 1934 very definitely overshadows those for the other three

years. To go further, you will note that with increasing dryness there is an increase in amount of pollen. This is not strange when we recall that during 1934 all too many grassland pastures were sadly taken over by the drought-resistant Russian thistle. It was during this year that persons mildly sensitive to chenopods had their first marked trouble. With the recovery of grasses during 1935, we find a decrease in amount of Russian thistle.

Ragweeds stand supreme with respect both to pollen concentration and number of cases in which it is involved. However, the folly of considering it as the only important cause of fall hay fever will be very clear from data which Dr. Ellis and Dr. Sweetser will soon present. The pollen graphs reveal several points of interest. First, the data of all four years have shown that the middle of August finds the pollen count first attaining serious proportions. Here, then, would appear to be a very good explanation of why so many hay fever patients have their first symptoms on August 15. Further, the data demonstrate that there are, in general, three marked critical peaks of pollen production. The first occurs about August 23. The second peak at the end of August represents the highest concentration for the season. A third peak of similar proportions to the first occurs about September 10. This behavior has been consistently followed during the first three years of the survey. The year 1935, with its excessive heat, showed some striking deviations. Most serious was the attainment on August 23 of a peak quite out of proportion to any this early in the month. The suffering which it caused will be remembered by those concerned with hay fever. After this date, the count was fairly normal, becoming rather low with the advent of cooler weather during the last part of August and first part of September. Return of warmer weather on September 12 again produced an abnormally high pollen concentration which was likewise correlated with distressing hay fever symptoms. September 24 is worth noting since it shows a peak unusually high for this late date, as was true for the chenopod group which was mentioned before. Obviously, it represented a critical date for persons sensitive to both groups.

In summary of the ragweed group, we see that the seasonal totals are strikingly similar for the

first three years of our survey. The year 1935, which provided bare areas and sufficient rainfall for luxuriant growth of ragweeds, showed a total pollen count which was 50 per cent in excess of the three year average.

Finally, we come to a group which has been more or less ignored. In 1932, Dr. Rosendahl and Dr. Ellis called attention to the importance of various kinds of artemisia. Common names

applied to these plants are wormwood, sagebrush, absinth, mugwort, and carpet-sage. Their pollen counts are very low as compared to the groups just mentioned. Yet, they must be considered since their pollen is consistently present in the atmosphere during July, August and September. Further, the group reaches its height of pollen production after the middle of September, thus serving to prolong the potentially troublesome season.

RESULTS OBTAINED IN TREATMENT OF HAY FEVER WITH POLLEN EXTRACTS*

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THE relief of hay fever by subcutaneous injections of pollen extracts was first attempted in 1905 by Dunbar, a physician of Hamburg. Noon's favorable report in 1911 created widespread interest in this method. Circumstances favored Noon's success in that hay fever in England is caused chiefly by the pollens of grasses. Since there is little evidence of any specific differences in the hay-fever-causing substances of the various grass plants, there is little opportunity for error in the specific treatment of grass hay fever.

If the treatment of hay fever with pollen antigen is to succeed, it must be specific. Specific treatment demands a correct and complete diagnosis of the causes for each individual sufferer. Obviously this demands an exact knowledge of the pollens which are present in the environment of the patient coincident with the occurrence of his symptoms. A correct diagnosis is impossible without a knowledge of the period or season during which each kind of pollen pollutes the air. The results of skin tests are of relatively little value unless correlated with data concerning pollen incidence and the period of symptoms of the patient. Treatment material for the individual patient must contain extracts of all pollens to which sensitivity is demonstrated when the pollination period coincides with the period of symptoms.

Much misconception concerning diagnosis and treatment has arisen through the classification of hay fever into certain types, as spring, summer, and fall. The spring type by tradition is due to the trees, the summer type to the grasses, and the fall type to the ragweed. The inexperienced is led to conclude that patients exhibit symptoms due to single causes and that they naturally fall into these types. This conception, which one finds in standard textbooks of medicine and in the literature of biological houses, does not take into consideration many important causes. Furthermore, little consideration is given to the common multiple sensitivity which wipes out such classifications as spring, summer and fall types. In a study of three hundred cases only 15.65 per cent could be so classified. In approximately 85 per cent this conventional classification is wiped out by multiple sensitization. (See Table I.)

The real truth of the matter is that the air is polluted with pollen by a succession of plant forms from the time that plant reproduction begins in the spring until this is ended by frost. No simple classification can take the place of an accurate knowledge of the air-borne pollens and the exact periods during which air pollution occurs. Thanks to the coöperation of Professor Otto Rosendahl of the Department of Botany of the University of Minnesota we now have more complete data concerning the causes of hay fever for Minnesota than have yet been assembled for

*From Department of Preventive Medicine and Public Health and Students' Health Service, University of Minnesota. Read in symposium on Hay Fever at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, June 4, 1936.

TABLE I. SEASON OF SYMPTOMS AND CAUSES FOR 300 PATIENTS

Apr.	May	June	July	Aug.	Sept.	Oct.	Number	Per cent	Causes
.....							3	1.	Trees
							2	.66	Trees
							12	4.	Grass
							20	6.66	Weeds (not ragweed)*
							10	3.33	Ragweed
							118	39.33	Total
							71	23.65	Ragweed and weeds*
							61	20.32	Grass, weeds* and ragweed
.....							3	1.	Trees, grass and weeds
							300	99.95	Trees, weeds

*Includes chiefly members of the amaranth, chenopod, dock, and plantain groups.

TABLE II. RESULTS OF TREATMENT

Relief	Series I		Series II		Series I and II	
	Patients	Per cent	Patients	Per cent	Patients	Per cent
Complete	24	38.	33	41.2	57	40.
Marked	16	25.4	28	35.	44	30.8
Fair	10	15.9	13	16.3	23	16.
Slight	10	15.9	4	5.	14	9.8
None	3	4.8	2	2.5	5	3.4
	63	100.	80	100.	143	100.

any region on the American continent. The chief essentials of this data already published in MINNESOTA MEDICINE† properly applied renders accurate and complete diagnosis relatively easy.

Adequate Treatment

Next in importance to that of correct diagnosis the most important factor affecting results with specific treatment is that of dosage. There is no way of determining in advance of treatment the size of the dose that will be effective in an individual patient. The aim should be to create as high a state of tolerance as possible. This means the attainment of as large a dosage within certain limits as is reasonable.

Treatment Results

Knowledge concerning the causes of hay fever for Minnesota and especially the Twin Cities is now practically complete. With our increased knowledge we have increased our accuracy of diagnosis. What results can be expected with specific treatment?

Following the season of 1935 we were able

to obtain reports on the results with specific treatment of 143 patients, all treated with pollen extracts prepared under our own supervision. These extracts were prepared and dispensed by the University Hospital Pharmacy. All pollens used were certified as to correctness and purity by the University of Minnesota Department of Botany.

The report concerns two series of patients. Series I consisted of sixty-three students of the University treated at the Students' Health Service. Series II comprises eighty patients treated by physicians engaged in private practice. These patients (Series II) received diagnostic tests at the hands of their own physicians with pollen materials obtained from the University. The results of the tests and a record of the period of symptoms were forwarded to us and served as the basis for compounding the treatment mixtures.

The results of treatment were rated as follows:

Complete or near complete relief	..90% to 100%
Marked relief	 75%
Fair relief	 50%
Slight relief	 25%
No relief	 0

†R. V. Ellis and C. O. Rosendahl: The Specific Treatment of Hay Fever with Especial Reference to Minnesota. MINNESOTA MEDICINE, July, 1934.

The results in Series II were slightly better than for Series I, especially for the classification of slight and none. The combined results for Series I and II gave 40 per cent complete relief, 30.8 per cent marked relief, 16 per cent fair relief, 9.8 per cent slight relief, and complete failure in 3.4 per cent. (Table II.)

Since the treatment materials were all derived from the same source and the mixtures were all prescribed by myself, any errors concerning treatment materials furnished should have been fairly constant.

There was considerable variation in the period or duration of treatment, the interval between treatments, the total number of treatments given and the dosage.

Neither the number of injections given (Table III) nor the length of the period over which treatment extended (Table IV) correlate as well with results obtained as does dosage (Table V).

TABLE III. NUMBER OF TREATMENTS

Series	Maximum		Minimum		Average	
	I	II	I	II	I	II
Relief :						
Complete	30	34	12	16	21.6	26.
Marked	26	40	10	15	17.4	23.7
Fair	21	35	10	14	14.3	22.1
Slight	25	32	10	14	14.	22.
None	22	30	18	7	20.	18.

Comparison of Results with Previous Treatment

Increase in knowledge concerning the causes of hay fever and the increased accuracy of diagnosis should improve results of treatment. Very few patients in Series I had had previous treatment. However, of the eighty patients in Series II, forty-one had had treatment previously for a combined total of one hundred four years, or an average of 2.5 years each. 87.8 per cent of these patients reported better results than with any previous treatment, while 12.2 reported results

about the same as before (Table VI). It seems reasonable to attribute this improvement in results to increased accuracy of the specific treatment.

TABLE IV. TREATMENT PERIOD IN WEEKS

Series	Maximum		Minimum		Average	
	I	II	I	II	I	II
Relief :						
Complete	30	28	13	7	20.4	15.9
Marked	29	27	10	5	19.	15.7
Fair	25	27	13	7	16.5	17.
Slight	26	28	9	11	16.3	16.
None	15	15	13	5	13.9	10.

TABLE V. DOSAGE IN MG. NITROGEN

Series	Maximum		Minimum		Average	
	I	II	I	II	I	II
Relief :						
Complete	.15	.25	.012	.02	.067	.125
Marked	.1	.25	.01	.01	.042	.094
Fair	.06	.2	.005	.01	.023	.068
Slight	.035	.075	.003	.01	.02	.04
None	.037	.2*	.012	.0005*	.028	

*One case.

Reports concerning the results of specific treatment are not numerous. It is interesting to compare the results obtained in this study with a few of the more noteworthy published results (Table VII). The results in both Series I and Series II are better than for any of the others. The results obtained by Piness in Los Angeles compare more favorably with Series II. He reported a lower percentage of excellent results than for Series I but he also had a lower percentage of poor results. These results are all the more interesting if account is taken of the amounts of pollen to which patients are exposed in the regions concerned. It will be seen that Piness is favored by a small pollen incidence, only a trace as compared with that of our own region.

TABLE VI. COMPARISON OF RESULTS WITH PREVIOUS TREATMENT
SERIES II

Relief	No	Previous Treatment		Av.	Results This Year		
		Yes	Case Yrs.		Improved	Equal	Not as Good
Complete	15	18	63	3.5	15	3	0
Marked	11	17	30	1.7	15	2	0
Fair	9	4	6	1.5	4	0	0
Slight	3	1	5	5	1	0	0
None	1	1	?		1	0	0
	39	41	104	2.5	36 (87.8%)	5 (12.2%)	0

HAY FEVER—SWEETSER

TABLE VII. RESULTS WITH SPECIFIC TREATMENT OF HAY FEVER

		Percentage Results		
		Excellent	Satisfactory	Poor
Cooke and Vander Veer	(3)	12.	52.	36.
Vander Veer	(3)	23.	49.	28.
Walker	(3)	25.	52.	23.
Backemann	(2)	10.	66.	24.
Piness	(1)	29.6	61.5	9.1
Series I	(4)	38	41.2	20.8
Series II		41.2	51.2	7.6
Series I and II		39.1	46.7	13.2

Relative Amount of Pollen

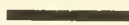
- (3) New York City: 
 (2) Boston, Massachusetts: 
 (1) Los Angeles, California: 
 (4) Minneapolis, Minnesota: 

TABLE VIII. TREATMENT REACTIONS

Relief	Complete		Marked		Fair		Slight		None		Total	
	I	II	I	II	I	II	I	II	I	II	I	II
Hay Fever		11		5		1		1				18
Asthma	1	7		14				1			1	22
Urticaria	1	16		3	1	1		1			2	21

	Injections	Reactions	Per cent
Series I	1145	3	.2
Series II	1654	61	3.6

Treatment Reactions

Treatment reactions may range from mildly unpleasant to dangerous. Careful attention to and increased familiarity with technic of administration will render them infrequent. In my own Series I reactions occurred following three of 1,145 injections, or in 0.2 per cent. In Series II reactions were eighteen times more frequent

than in Series I (See Table VIII). Many of these reactions can be attributed to a too short interval between treatments. An interval of five to seven days seems to be ideal.

Reactions are largely avoidable and fear because of them is no longer a justifiable reason for non-use of the method.

MULTIPLE SENSITIVITY IN HAY FEVER*

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THE goal to be sought in the treatment of hay fever is the complete absence of symptoms—nasal, ocular, or asthmatic. This goal can be achieved in some cases. It can be approached in almost all cases. An adequate conception of what hay fever is, followed by a

proper study of its causes, and a thoroughgoing scheme of treatment will accomplish this result.

For years we have known that hay fever is one manifestation of an allergic constitution, that people who came to us complaining of hay fever, including fall hay fever, kept on coming to us with winter colds, perennial hay fever, asthma, eczema, or hives. We have known that

*Read in symposium on Hay Fever at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, June 4, 1936.

these people have told us that their parents, their sisters, their cousins, or their aunts have had hay fever or asthma, or that their children have had eczema or hives. But for almost as many years we have seen, and our patients have seen, advertisements saying that "95 per cent of fall hay fever can be cured by treatment with ragweed pollen extract." And for almost as many years we have given fifteen doses of ragweed pollen extract out of fifteen little bottles. Sometimes our results have been good, but too often our fifteen little bottles have failed to satisfy either patient or doctor. Gradually we have been forced to investigate further.

As Dr. Rosendahl and Mr. Dahl have already shown, there is not one, but there are many plants in Minnesota whose pollen is such that it can cause hay fever. Dr. Ellis has demonstrated that persons suffering from hay fever are likely to be just as sensitive to others of these plants, as well as to ragweed.

I am sorry that I must further complicate this picture, or perhaps better say that I must further clarify the status of the patients who are less easily treated. During the past three years I have studied, more and more completely, one hundred people whose complaint was fall hay fever. This study included the family history, particularly in regard to allergic manifestations, personal history, general physical examination, and skin tests for the groups of pollens discussed by Dr. Rosendahl and Dr. Ellis, and also an increasing series of foods, animal danders and dusts. The results of this study, which includes a heterogeneous group of dispensary and private patients varying in age from eight to seventy-four years, agree, in regard to pollens, to a remarkable extent with those of Dr. Ellis. Among these hundred patients the history of others in the family with allergic symptoms was high. I have not charted these because the error in diagnosis must be such as to make percentages untrustworthy. I have, however, charted the other allergic diseases among patients themselves. Sixty-one of the one hundred patients had other allergic symptoms than just hay fever—asthma for the most part, then perennial hay

fever often associated with nasal polyps, also urticaria, eczema and migraine.

The results of skin testing are important. Among the one hundred patients there were only four who were, perhaps, sensitive to ragweed alone. These came early in the series and their skin tests were very limited in number. Possibly some were sensitive to proteins we were not using at that time. There were ninety-two who were sensitive to ragweed, and also to other pollens, to foods, to epidermals, and to dusts. Of these, sixty-one were sensitive to proteins other than pollens; and these account for many of the unsatisfactory results. On the other hand there were four patients who were not sensitive to ragweed in any degree that I could discover. These also had fall symptoms. One was sensitive to the sage wormwood family of plants, to corn and to horse dander. Another was sensitive to the proteins of the grains and his symptoms came with the cutting and threshing of the grain on his farm. Failures among this small group are inevitable if they are treated with ragweed pollen only.

To return to those sensitive to ragweed and also to other proteins, this is the group in which partial relief is the rule, but complete relief is difficult to obtain. It would be easy to cite cases: the woman sensitive to feathers who goes through the chicken house at the County Fair, or sleeps on a feather pillow; the man sensitive to dog hair, who cannot bear to part with his best friend for even six weeks, and on and on. The figures are enough to show that the simple picture is the rarity. The failures are usually the patients with the more complex pattern.

Last year the ragweed pollen count was very high and patients not intensively treated had more intense and more prolonged symptoms than usual.

To summarize and conclude: Fall hay fever is one manifestation of an allergic constitution. Fall hay fever can be treated with results that compare well with any procedure in medicine, namely 85 to 90 per cent success. Failures are due to: (1) incomplete diagnosis; (2) incomplete treatment; and (3) insufficient treatment.

THE CLINICAL SIGNIFICANCE OF THE SEDIMENTATION RATE IN CORONARY OCCLUSION*

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IN recent years an enormous amount of literature has accumulated relative to the various phases of the subject of coronary thrombosis. One would expect therefore to find numerous references to the sedimentation rate of the red cells in this disease, particularly, as the pathological change in this condition is one that would suggest at once an increase in the sedimentation rate. However, the paucity of published detailed reports is striking.

Rabinovitz, Shookhoff, and Douglas,³ in 1931, reported the sedimentation rate in ten cases of coronary occlusion. Their findings indicated that the sedimentation rate was definitely increased, that this increase appeared later than the leukocytosis and fever, and persisted longer. They felt that it was of value as an index of healing. In 1934 Burak² studied six cases, verified the findings of Rabinovitz, and also felt that it had some diagnostic value. The following year Bickel, Mazer, and Sciclono¹ found a high sedimentation rate and felt that it indicated a softening of the heart muscle, and was due to absorption of necrotic tissue. They felt it was not due to cyanosis or myocardial failure. In 1936 Wood reported seven cases. Two were seen seventeen and forty-nine days after the occlusion and showed normal figures; the remainder all showed accelerated rates. He emphasized the fact that the presence of myocardial failure retarded the sedimentation rate, and that this fact must be considered in interpreting the rate in coronary occlusion.

An increase in the sedimentation rate is found in infections, malignancy, hyperthyroidism, healing wounds, fractures, etc. The mechanism producing this change, although not entirely clear, apparently is associated with serum globulin and at times serum fibrinogen changes.

This report is based on observations made on sixteen cases of coronary thrombosis, in which the diagnosis could not be questioned.

All other conditions known to produce an increase in the sedimentation of red cells were ruled out and not included in this series.

The technic used was that of Westergren, and only the one hour reading is reported. In many cases, it was not possible to continue the determinations until the rate had returned to normal.

Values in millimeters at the end of one hour according to Westergren and Burak are:

WESTERGREN		BURAK
mms. (male)	mms. (female)	mms.
1	4	Subnormal
3	4-7	Normal
4-7	8-11	Borderline
8-11	12-15	Weakly positive
12-35		Moderately positive
35-80		Strongly positive
80		Very strongly positive
		8-15
		16-30
		31-60
		80-100

A brief summary of the history of each case is given which perhaps adds a little to the significance of the figures found. The diagnosis of coronary thrombosis was made either by the alteration in the electrocardiograms, while the patient was under observation, or by the autopsy examination.

In our determinations we have taken any reading above fifteen as being suggestive, although the reaction usually was so marked that there was no question as to its significance. In this series no attempt was made to group the cases according to the severity of the attack or on the basis of the degree of change in the sedimentation reaction. Although there does seem to be some relationship between the degree of injury as judged by the clinical history and course of the illness with sedimentation rate, this is not at all constant.

Case 1.—A steel worker, thirty-eight years of age, for the first time, four weeks before, had suddenly experienced a sharp pain that began on the lateral aspect of the right arm and radiated across the chest to the left arm. This was accompanied by a sense of constriction and he had to stop walking until the sharp pain ceased after about three minutes. For four weeks he had had some pain almost every day.

*Read before the Minnesota Society of Internal Medicine, November 11, 1935.

CHART I

Case 1		W.B.C.	T.	P.	B.P.	Pain	E.K.G.
Day	S.R.						
1		20,000	99.6	90	150/80	Sev.	Flat T-1 Invert. T-1
2	8	11,200	101.6	110		Sev.	
4	73	15,000	100.0	100	120/70	Mod.	
6	76	12,700	99.6	78		Mod.	
9	68	9,800	98.8	88	115/75	None	
12	55	8,000	98.0	80	120/80	None	
17	8		98.0	80		None	
19	6	8,900	98.0	80	115/70	None	
23	2		98.0	80		None	

CHART II

Case 2		W.B.C.	T.	P.	B.P.	Pain	E.K.G.
Day	S.R.						
1	6	16,200	98.8	80	120/80	Mod.	Norm.
2		14,900	99.2	78			
4	42	9,400	98.6	72		Mod.	T flat
8	39	7,400	98.2	68	106/76	None	
12	13	7,400	97.4	70	106/76	None	T invert

CHART III

Case 3		W.B.C.	T.	P.	B.P.	Pain	E.K.G.
Day	S.R.						
1	21	7,200	Nor.	78	144/102		L. Vent. Prep. T-1 flat
2	24	7,400	Nor.	78	166/110		
4		9,900	Nor.	84			
5	11	10,000	Nor.	82			
9	13	10,000	Nor.	80	160/110		
11	15	8,000	Nor.	70	148/94		Normal
16	12	12,000	Nor.	86	136/94		
24	25	12,000	Nor.	76	164/190		
34	28	17,500	Nor.	74	180/110		
44	27	7,600	Nor.	74	186/110		
69	23	11,500	Nor.		190/110		

Slight exercise and overeating would cause trouble. The night before he entered the hospital, he had a pain that lasted twenty-five minutes. The morning of his entrance to the hospital, he had another severe pain that did not respond to the measures that formerly gave relief.

The examination showed a marked puffiness of both lids, more marked on the right side. The heart showed nothing of note.

Comment.—In this case the sedimentation rate came back to normal between the twelfth and the seventeenth day. He was allowed to get out of bed, and on gradually increasing exercise he had no recurrence of his trouble. Because of previous experience, it was thought that an interval of five days between test determinations would be sufficient at such an early stage of the disease, and the sudden return of the sedimentation to normal was then quite surprising. Several of the later cases also showed a rather quick return to normal.

Case 2.—Two days before his admission, a grocer, forty-one years of age, had a sharp precordial pain that lasted only a few seconds. On the morning of his admission to the hospital, he had a constant substernal pain, which was still present when he entered the hospital four hours later. The physical examination showed a short presystolic murmur in the mitral region, and the x-ray examination of the heart showed a mitral contour.

Comment.—This patient made an uneventful recovery, but at times he had some indefinite pains that might have been coronary.

Case 3.—A professional man, aged thirty-seven, has been under observation for a number of years, and at no time has he had any indications of heart disease. On one occasion, several years ago, he had a severe pain in his right leg, which was diagnosed, in another city, as Buerger's disease. Examination three weeks later failed to disclose any trouble. For the last two years he has been having a rise in blood pressure that appeared to be advancing quite rapidly.

The night before entrance to the hospital, he experienced an intense pain, starting between the shoul-

CHART IV

Case 4		W.B.C.	T.	P.	B.P.	Pain	E.K.G.
Day	S.R.						
1	37	26,000	98.0	120	220/90	Severe	Def. changes
2	89	24,000	99.6	122	128/90	Severe	
5		10,000	99.4	110	140/90	Severe	
10	81	9,500	98.8	100	138/90	None	T-1 flat
15	88	9,900	98.6	94	120/90	None	
19	84	7,600	98.6	80	120/88	None	
24	81	8,400	98.6	86	129/69	None	
27	73	7,800	98.6	82	118/72	None	
34	76	11,000	98.6	80	130/80	None	
41	66	10,000	98.6	80	140/80	Slight	
62	36	11,000	98.6	78	140/80	None	

CHART V

Case 5		W.B.C.	T.	P.	B.P.	Pain	E.K.G.
Day	S.R.						
4	90	11,000	100.4	96	110/80	Severe	T-1 invert
6	88	9,600	101.0	96	80/80		
7	90	8,400	99.2	94			
8	90	7,600	98.6	100	110/80	Moderate	T-1 arch.
9	82	8,400	98.6	94			
10	98	8,600	99.4				
11	98	8,800	98.6	92			
12	90	7,200	98.4	82			
14	90	6,400	99.0	80	120/76		
16	90	6,400	98.0	76			
18	90	8,800	98.0	80	118/80		
20	96	6,200	98.0	82			
23	80	7,700	98.6	82	114/80		

der blades and extending around over the left precordial region. This pain lasted about twenty minutes. Examination showed a moderate obesity, a tympanitic second aortic sound, and a blood pressure of 180/100.

Comment.—This case is interesting as this patient had only one pain. The sedimentation rate was normal from the fifth to the sixteenth day, and then rose to its previous level. During this period there was a slight increase in the leukocyte count. The moderate increase in the sedimentation rate was present for over two months, and during this period the patient complained of some distress in the left upper abdomen and left chest which presumably was connected with an active process in the heart muscle. Both the clinical and the laboratory courses of this case were quite unusual, and suggest the possibility that in some cases a patient does not recover very quickly from even slight myocardial injuries, and that there might be going on, at the same time, both healing and extension of the process. If such a condition does occur, this method of study should prove to be excellent as a means of following the course of the process.

Case No. 4.—A housewife, fifty years of age, gave a history of having been under a physician's care for

heart trouble seven years ago. At that time, she complained of dizziness and shortness of breath. Five years ago she had a cholecystectomy, but no heart disease was noted then.

Two weeks before entrance to the hospital, she had had a severe precordial pain and shortness of breath, and twenty-four hours before she had had a sudden severe pain in the right shoulder extending down the right arm. She said it felt as if her arm was broken. Later the pain extended over the precordium. One-half grain of morphine did not stop the pain, but it gave some relief. The blood pressure was 220/120. Cyanosis of the lips and finger tips was present, and the face had an ashen hue.

Comment.—At the end of the sixty-second day, the sedimentation rate was still high, although it had dropped to one-half of its former value. The leukocyte count, at the fifth day, was almost normal. After the fifteenth day, there was no longer any pain.

Case 5.—Male, aged fifty, a merchant.

For two years, off and on, this patient had complained of precordial pain following exertion and heavy eating. Three days before entrance to the hospital, while in a hotel in Chicago, he had a very severe pain over the entire upper chest, which was relieved by morphine.

Comment.—At the end of the twenty-third

CHART VI

Case 6							
Day	S.R.	W.B.C.	T.	P.	B.P.	Pain	E.K.G.
1	32	9,500	98		240/120	Moderate	T-1 changed
2	35	11,000	99.2		180/80	None	T-1 flat.
3	61	8,400	98		190/90		
4	75	8,000	97		190/90		
5	70	7,200	Nor.		190/100		
6	71	8,400	Nor.		190/100		
7	74	8,000	Nor.				
8	59	8,000	Nor.		190/100		
9	57	6,200	Nor.				
10	34	8,000	Nor.				
12	66	6,000	Nor.		170/100		
13	50	6,000	Nor.		160/80		
14	61	10,000	Nor.				T invert
19	59	6,000	Nor.		190/90		
20	53		Nor.				
43	40	5,700	Nor.		240/100		

CHART VII

Case 7							
Day	S.R.	W.B.C.	T.	P.	B.P.	Pain	E.K.G.
2		14,000	97.6	72	190/120	Dull	Inver. T-I & T-II
3	42	13,200	100.2	84			Inver. T-I & T-II
4	47	10,400	99.6	80			
5	64	9,200	99.2	80			
6	87	5,600	98.6	70			
7	79	6,800	98.4	70			
8	80	8,000	98.6	74			
9	77	7,500	99.8	70			
10	80	7,600	98.4	70			
13	85	7,200	98.2	72			
14	65	7,200	98.4	70			
17	53		98.4	70			T inver.
19	60		99.0	68			
21	32		99.0	70			
24	51	5,600	99.0	62			
25	51	7,600	98.6	64			
26	50	6,800	99.0	72			
27	41	6,600		74			
33	39	8,800					

day the sedimentation rate was still very high, although the leukocyte count was normal on the seventh day. The patient was sent home to bed, and on the thirty-seventh day he had another attack, which was much more severe than the previous one. One and one-half years later, he still has precordial pains on exertion or excitement.

Case 6.—A manufacturer, seventy-four years of age, gave a history of having had precordial pains for a number of years. The present attack apparently began early on the morning of the day of admission. There was severe precordial pain radiating to the left arm, with nausea. The examination, except for a marked hypertension and an enlargement of the heart to the left, was negative.

Case 7.—A woman, aged seventy-three, the day before admission to the hospital, began to complain of a dull ache over the precordial region, extending into

the left arm. Her past history was negative. The examination showed a heart enlarged to the left, and a blowing systolic murmur over the precordium. On admission the blood pressure was 190/120. The following day the pain disappeared.

Comment.—The sedimentation rate in this case did not run as uniform a course as did most of the others. Ninety-seven days after the onset, the patient died at home of pulmonary embolism. The autopsy examination showed several scars in the myocardium with marked sclerosis of the coronary arteries.

Case 8.—The patient, a woman aged sixty-six, had precordial pains off and on for three years. The last attack, which was very severe, began on the morning of her entrance to the hospital. The pain was located in the precordium and radiated to both shoulders. It was not relieved by nitroglycerin.

CHART VIII

Case 8							
Day	S.R.	W.B.C.	T.	P.	B.P.	Pain	E.K.G.
1	67	7,000	100.0	80	150/90	Severe	Nothing definite
3		6,500				Moderate	
5		9,800				Moderate	
8		10,850				Moderate	
11	68	7,400	98.6	88	164/88	Moderate	
15		7,100				Moderate	
24		7,000				Moderate	

CHART IX

Case 9							
Day	S.R.	W.B.C.	T.	P.	B.P.	Pain	E.K.G.
5	84	8,600	98.0	70	164/80	Moderate	Flat T-1
7	70	4,300	98.0	120		Severe	T-1 flat
9	74	11,200	99.6	120	175/110	Moderate	
10	73	12,000	101.0	140	135/86	Severe	

CHART X

Case 10									
Day	S.R.	W.B.C.	T.	P.	B.P.	Pain	E.K.G.		
1	44	8,300	98.0		220/86	Moderate	Invert T		
12	53	6,000	98.0		190/110				
17	26	6,900	98.2		210/110				
25	103	8,800	100.4		130/70				
27	108	10,000	98.2		120/70				
30	111	10,300	98.0		125/80				
37	109		98.2						
78	55		98.6						
84	112		97.0		137/70		Invert T-1		
137	71	9,200	97.2		140/86				
145	78	10,200	98.2						
147		8,500	97.0						
187		10,150	97.0						
204	60	8,400							

Comment.—This was the only case in the group in which there was not definite electrocardiographic evidence of coronary infarction. The leukocyte count was slightly elevated on the eighth day, but the sedimentation rate was very high on the last day. This patient continued to have pain for six weeks after leaving the hospital, when she moved to California.

Case 9.—A retired merchant, aged fifty-six, for eight years had had attacks of burning precordial pain on exertion. These pains would cause him to stop work until it disappeared. Five days before entrance to the hospital, he had had three attacks of pain that were not relieved by rest or medication. The following day, he drove 500 miles by auto to return to his home. Since that time, the pain, although not severe, was more or less continuous.

Coronary thrombosis was suspected, and against his will he was put to bed. Physical examination was essentially negative, although the heart tones at the apex seemed unusually soft. The blood pressure was 140/80, and whereas formerly it was 160/100.

Comment.—On entrance into the hospital the leukocyte count and temperature were normal. The sedimentation rate was 84 mm. The electrocardiogram showed evidence of coronary disease but was not characteristic of coronary thrombosis. It was felt, however, because of the high sedimentation rate, that he had a coronary occlusion that had occurred five days previously, but in the interim the temperature and leukocyte count had returned to normal. Two days after admission into the hospital, a loud precordial rub was heard, and the patient died five days after his entrance.

Case 10.—This patient, a woman aged eighty-one, for years had been under medical care for coronary sclerosis and hypertension. She was admitted this time for pain over the precordium that radiated into the left arm. The heart was enlarged to the left; the blood pressure was 220/86. The second aortic and second pulmonic heart tones were accentuated.

Comment.—This patient entered the hospital

CHART XI

Case 11							
Day	S.R.	W.B.C.	T.	P.	B.P.	Pain	E.K.G.
1	5	9,200	100.2	100	126/90	Severe	T-1 inver. T-2 flat
2	15	15,900	98.0	80	120/90	None	
4	18	12,000	98.0	80	128/90	None	
6	7	13,400	98.0	80	130/90	None	
9	7	10,000	97.0	60	122/80	None	
13	2.5	8,600	97.0	64	120/80	None	

without any increase in temperature or leukocyte count. The sedimentation rate was only mildly elevated at the onset; later it reached the highest of any in the group. The x-ray at the onset showed some pulmonary congestion. On the 187th day there appeared to be a great deal of pulmonary congestion and a question of pulmonary infarction arose. It is difficult to say just how much this had to do with raising the sedimentation rate. This patient eight months later died, and the autopsy showed pipestem coronary arteries, but no definite evidence of coronary occlusion.

Case 11.—The patient, a man aged thirty-nine, never had had cardiac trouble, except that two days before the attack he had had a slight precordial pain that lasted only a moment. The attack itself was very severe and consisted of upper abdominal and precordial pain with nausea. Physical examination was negative except for the ashen color of the face, the listlessness, and dyspnea. Five hours after the onset, a definite precordial friction rub was heard, which disappeared by the next morning. Within one hour after the attack the first sedimentation rate was made, and it was normal.

Comment.—This case shows several interesting points. The sedimentation rate rose after the leukocyte count, as in the other cases, but returned to normal in four days, several days before the leukocyte count came down. It is difficult to believe that a coronary infarct could heal in such a short period and some doubt is cast on the value of the sedimentation rate as an indicator of healing. Here, as in one other case, the rate too returned to a subnormal value. The significance of this reading is not clear.

Case 12.—A woman, aged sixty-four, had a very severe precordial pain two days before entrance into the hospital. On admission the temperature was 101.4, pulse 98, blood pressure 154/96, leukocytes 13,600, sedimentation rate 93 mm. The electrocardiograph showed an inverted T-I. This patient died eight days after entering the hospital. No autopsy was secured.

Case 13.—A physician, aged fifty-nine, for six months previous to his present attack, had noticed progressive

shortness of breath. Occasionally he had a mild anginal pain. The present attack began with a sudden severe pain in the midsternal region, radiating to the right arm. With this was shortness of breath and the feeling of compression in the chest. The pain lasted four hours. The blood pressure, which was formerly 160/100, dropped to 100/60. Twelve hours after the onset there was a pericardial friction rub present. Temperature on entrance to hospital was 100.8. On the day of the attack the leukocyte count was 6,200. The second day the count was 10,000 and the sedimentation rate in one hour was 45 mm. On the fourth day it was 40 mm. The electrocardiograph showed delayed conduction. The patient recovered from the attack and died of carcinoma of the stomach one year later.

Case 14.—A woman, aged fifty-five, had had hypertension for eight years. For one year she had anginal pains of a mild character. The present attack began with a severe pain over the precordium, which lasted half an hour. The blood pressure which was formerly 180/100 was now 100/40. Extra systoles were present, heart tones poor, râles were present at the bases of both lungs. The electrocardiograph showed myocardial damage and left axis deviation. Two days after the attack the temperature was 101, leukocyte count 16,000, sedimentation rate 90 mm. The patient died five weeks later of pulmonary embolism. No autopsy was secured.

Case 15.—A laborer, aged seventy-eight, felt perfectly well until twenty-four hours before admission to the hospital, when he experienced a severe anginal attack. Two days later the leukocyte count was 13,400, the sedimentation rate was 98 mm. On the third day the sedimentation rate was 80 mm. He died on the fifth day. The autopsy showed a large coronary infarct.

Case 16.—A woman, aged sixty-four, had had hypertension for eight years. Thirty-six hours before her entrance to the hospital, she developed a severe precordial pain with nausea and vomiting. Previously, she never had had anginal pains, although for a year she had dyspnea. On entrance the leukocyte count was 16,000, and the sedimentation rate was 93 mm. The electrocardiograph showed an inverted T in the first lead and an arching ST. The temperature on admission was 101.2. She died at the end of the eighth day. No autopsy was performed.

Discussion

Sixteen cases of coronary occlusion were studied. Every case showed an increase in the sedimentation rate of such magnitude that its signifi-

ificance cannot be questioned. Only four cases failed to show a rate of over 50 mm. in one hour, and these four showed a reading of 18, 28, 42 and 45 mm. The remaining cases at some time during the illness showed a rate of 70 mm. or more, all very strong reactions.

CHART XII

Sex	Age	Sed. Rate	Outcome
M.	38	18	Recovered
M.	37	28	Recovered
M.	41	42	Recovered
M.	59	45	Recovered
F.	66	68	Recovered
M.	74	75	Recovered
M.	38	76	Recovered
M.	56	84	Died
F.	73	87	Recovered
F.	50	89	Recovered
F.	55	90	Died
F.	64	93	Died
F.	64	93	Died
M.	50	96	Recovered
M.	78	98	Died
F.	81	112	Died

Although Rabinovitz and his co-workers found that the increased rate occurred at periods ranging from two to five days after the attack, we had several cases that showed a definite but not maximum increase in the first twenty-four hours. In the other cases seen on the first day the rate was normal. It appears to be quite definite, however, that in the majority of the cases the leukocyte count and the temperature rise before the sedimentation rate. Therefore in the first few days following the occlusion its diagnostic importance does not rank with the temperature and the leukocyte count. Its real value lies in the fact that it usually persists for a much longer period than either of the above mentioned factors, which are often quite brief in duration and occasionally even absent. In Case 9 the occlusion evidently occurred five days before the patient came under observation. The history was not typical of coronary thrombosis. The leukocyte count and temperature were normal. The sedimentation rate was 84 mm. The development of a pericarditis two days later proved the presence of the thrombosis. In this case a coronary thrombosis was suspected but the only evidence that we had that an acute injury to the heart muscle had occurred was in the sedimentation rate. In Case 8 there was only a slight elevation of temperature for two days, yet the clinical history and the course was typical of an

acute coronary occlusion. The electrocardiograph and leukocyte count were normal, but the sedimentation rate reached 88 mm.

The sedimentation rate in all cases but one outlasted the leukocytosis and the rise in temperature. In Case 2 it had returned to normal in thirteen days; in Case 11 on the fourth day in Case 3 it was still high on the sixty-ninth day, and in Case 4 on the sixty-second day.

There is apparently no definite relationship between the severity of the attack as judged by clinical standards and the sedimentation rate. Neither can we predict the length of time that the sedimentation rate will remain increased. Case 1 had apparently a very severe attack of pain, prostration, cyanosis, a marked elevation in the temperature and the leukocyte count, yet, within twelve to seventeen days the rate had returned to normal, whereas, Case 2 had what seemed to be a very mild attack, but also had a very short period in which the sedimentation rate was elevated. Case 3 had only a mild attack with no rise in temperature and one of the lowest sedimentation rates in the entire group, yet it persisted over two months.

Although there is some variation in the sedimentation rates in individual patients from time to time, it is rarely great enough to be significant. Marked reduction in the reading on two successive days may indicate healing, or, if the rate is increased, a complication, such as an extension of the infarction, a pericarditis, or a new infarct.

From what we know of the conditions which are accompanied by an increased sedimentation rate, and of the nature of the pathological change in coronary occlusion, we can assume that as long as a sedimentation rate is elevated there is an absorption of the products of heart muscle degeneration, and that healing is completed when the rate has returned to normal. If this is true some cases have a healing of their injury in a period less than two weeks, whereas, in others, and perhaps the majority of the cases, the process may take longer than the six weeks period assumed at present as being the period necessary for healing to take place. Case 2 throws some doubt on the possibility that healing is complete when the rate has returned to normal. The observations of Wood that the sedimentation rate decreases with the onset of myocardial failure must be kept in mind.

The technic of the test is simple. The ap-

paratus is not elaborate and the performance of the test does not require the services of a highly trained technician. In this particular disease the deviation from normal is usually so marked that the reading presents no difficulty. From our own experience and that of others it seems that this test should prove itself to be of value in the treatment of cases of coronary occlusion and to a lesser extent in the diagnosis of this disease.

Summary and Conclusions

1. The sedimentation rate in sixteen cases of coronary thrombosis is reported.
2. Elevation of the rate was found in every case.
3. The degree of increase in the sedimentation rate is no index of the severity of the injury.

4. The return of the rate to normal usually means a healing of the infarction but this is by no means invariably true.

5. The determination of the rate is of diagnostic and prognostic value when considered with other findings.

I wish to thank Dr. Edgar Herrmann and Dr. John Briggs for permission to include several of their cases, and Dr. Kano Ikeda for his laboratory assistance.

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NAUSEA AND VOMITING OF PREGNANCY*

Fifty Cases Treated With Estrogenic Preparations

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THE woman suffering from nausea and vomiting of pregnancy presents a much more serious problem than is generally realized. The attending physician too frequently makes light of the symptoms with the thought that vomiting is a normal manifestation of pregnancy. The patient continues to suffer the distressing and often serious symptoms. One is probably too prone to feel that the nausea and vomiting will cease in due time and that little in the way of therapy will effect a cure. One searches diligently for the cause of a minor dyspepsia, and, with considerable care, plans the dietary and medicinal measures for its relief, while the woman suffering from nausea and vomiting of pregnancy receives little attention unless toxic symptoms appear.

It is estimated that one-third of pregnant women have nausea and vomiting as a marked symptom, one-third complain of this symptom in a mild degree, and the other third are entirely free from it. A certain percentage of pregnant women develop pernicious vomiting; some of

them will abort and a few of them will die.

The vomiting, with accompanying nausea, usually begins the fourth to the sixth week, but in many instances it may appear earlier and has been known to appear even before the first menstruation is missed. It usually lasts from six weeks to three months, most frequently ceasing during the fourth month. Primiparae vomit earlier, more constantly and more severely than multiparae. Vomiting may occur in succeeding pregnancies but usually in less severe form. As a rule, it ceases when the fetus dies. Certain animals, particularly dogs and cats, may suffer from nausea and vomiting of pregnancy.¹⁰

It is difficult, in a given case, to determine when the vomiting passes from the usual type to the severe form. Peckham,³⁰ in reviewing sixty cases of hyperemesis gravidarum occurring at Johns Hopkins Hospital, found that the time of onset, duration of vomiting, and loss of weight do not indicate the severity of the disease. Neither do they afford a safe guide for prognosis. He concluded that the urinary albumin is frequent but of slight prognostic importance and that a high ammonia coefficient is

*From the Brainerd Clinic. Read before a joint meeting of the Upper Mississippi and St. Louis County Medical Societies, Aitkin, Minnesota, April 25, 1936.

usually seen, yet a low one does not necessarily indicate a mild case. Therefore, there is little to aid one in determining when a mild case may become alarmingly severe. It is probable that the condition originates as "morning sickness" and gradually becomes more severe due to dehydration and starvation.

There is no field of obstetrics concerning which more divergent opinions are held, both as to etiology and therapy. Duncan and Harding¹² were convinced that in early toxemia of pregnancy the dominant factor is a metabolic one, due largely to a carbohydrate deficiency. Titus, Hoffman and Givens⁴⁰ stated that the carbohydrate deficiency is of twofold origin: a relative deficiency due to an unexpected demand for glycogen on the part of the fetus and enlarging uterus, and an actual deficiency from lessened carbohydrate intake. Other investigators have concurred with the glycogen deficiency theory.^{5,8,9,15,29,39} Haden and Guffey¹⁴ found a low blood chloride content and recommended the administration of sodium chloride. Hirst¹⁷ has advanced the view that vomiting of pregnancy is dependent upon deficient corpus luteum secretion. The theory that starvation brings about an acidosis or an alkalosis was advanced by Marchbanks.²⁵ La Vake²⁴ states that the nausea and vomiting are of toxic origin, the toxin being derived from the protein constituting the male element in the fertilized ovum and that this toxin acts on the vomiting center and vital organs. That the primary etiologic factor is psychotic or neurotic is maintained by Atlee,⁴ Allen,¹ and others. That some cases are of neurotic origin and others toxemic has been held by numerous writers.^{10,19,33,41,42} Arzt³ concluded that the low acid content of the stomach in early pregnancy may have some influence. Alvarez² describes reverse peristalsis resulting from pelvic disorders. Kemp²² believes the condition due to a cortico-adrenal deficiency. Disturbances of calcium metabolism,¹¹ foci of infection,³⁸ changes in the kidneys and ureters,²¹ toxic excretion from the zygote,¹³ and pelvic infections and displacements have been mentioned as etiologic factors in nausea and vomiting of pregnancy. Gallbladder disease, peptic ulcer, appendicitis, et cetera, are included as infrequent causative factors.

The types of therapy have been nearly as divergent as the theories of etiology. An analysis

TABLE I. TYPES OF THERAPY RECOMMENDED
(80 WRITERS)

Glucose solution intravenously.....	38
Oral or hypodermic sedatives.....	25
High carbohydrate diet.....	17
Corpus luteum extract.....	15
Alkalies	15
Insulin	14
Bromides per rectum.....	10
Saline solution intravenously.....	8
Hydrochloric acid orally.....	6
Ovarian extract	5
Glucose-saline solution intravenously.....	5
Adrenal cortex extract.....	3

of the literature over the past twenty years shows that the most frequent type of therapy consists of: glucose administered intravenously, with or without insulin; intravenous saline; bromides per rectum; alkalies; and corpus luteum extract. The mild type of case was most frequently treated with a high carbohydrate diet, oral sedatives and alkalies. Thirty-eight writers used glucose intravenously, saline was recommended by eight, a combination of glucose and saline by five, insulin was administered by fourteen, bromides per rectum by ten, oral or hypodermic sedatives by twenty-five, and a high carbohydrate diet was used by seventeen. Hydrochloric acid, orally, was recommended by six authors, corpus luteum extract was advocated by fifteen and ovarian extract was used by five. One investigator suggested placental blood serum.²⁷ Several writers stressed the elimination of foci of infection and correction of cervicitis, cervical erosions, et cetera. The advocates of the neurotic theory isolated their patients and directed therapy toward the elimination of neurotic factors. The administration of suprarenal extract has been used with great success by Kemp.²² Stemmer³⁶ also recommends adrenal cortex extract as an adjunct. Various other methods such as cervical tampons of mercuriochrome,³² electrotherapy,²⁰ ultra-violet irradiations,¹⁸ low protein diet,⁵ and blood serum of pregnant women¹⁷ have been recommended. The majority use a combination of several types of therapy and vary the treatment depending upon the cause. The results of all types of therapy would seem to show that 85 to 90 per cent of patients are relieved.

The series here reported consists of fifty cases of nausea and vomiting of pregnancy treated with estrogenic preparations. All classes of patients are included, though the majority were rural women. Sixteen patients, classed as mild

cases, complained of "morning sickness" and vomited a portion of their food; nineteen patients, moderately severe cases, vomited all their food and retained small amounts of fluid; fifteen patients, classed as severe, retained nothing by mouth, and showed weight loss and other features characterizing severe vomiting of pregnancy. Three of the fifteen patients classified as severe received intravenous glucose along with estrogenic therapy. The rest of the patients in this series received estrogenic therapy alone. No suggestive therapy was used and no special instructions as to diet or behavior were given to any patient.

The estrogenic preparations used in treating these patients were: ketohydroxy-estrin (amniotin, progynon, theelin), the benzoic acid ester of dihydro-estrin (progynon B), dihydro-estrin (progynon D tablets),* and a hydrostable compound from placenta containing trihydroxy-estrin (emmenin). The dosage of the hypodermic preparations varied from 25 to 250 rat units. The oral preparations were given when the patient was able to retain them, or following the hypodermic preparations as a safeguard against further vomiting. The preparations used at the present time, which seem to give the best results, are the higher concentrations of the hormone in oil. These are given intramuscularly in doses of 250 to 500 rat units, every second to fourth day until vomiting has ceased. The slower absorption and higher concentrations offer the advantage of larger dosage and less frequent administration.

TABLE II. NUMBER OF INJECTIONS REQUIRED

3 patients	1 injection
4 patients	2 injections
10 patients	3 injections
12 patients	4 injections
5 patients	5 injections
6 patients	6 to 7 injections
3 patients	8 to 9 injections
5 patients	oral or rectal

In this series forty-eight patients were completely relieved of all vomiting and two failed to react favorably to treatment. Eleven patients vomited again, from one to three weeks after therapy had been discontinued. All of these were retreated and the vomiting was completely controlled with estrogenic therapy alone. Nausea

continued in ten cases after the vomiting had ceased. Three patients stopped vomiting after the first injection, four following the second, ten following the third, and twelve following the fourth. Fourteen patients required from five to nine injections. Patients re-treated for subsequent vomiting usually required two to four injections. In the more recent cases, the patients treated with estrogenic substances in oil have averaged about four injections before vomiting ceased entirely.

TABLE III. MISCELLANEOUS DATA

Primiparae	21 cases
Multiparae	29 cases
Average age of patients	32.8 years
Youngest patient	17 years
Oldest patient	42 years
<i>Period Gestation Vomiting Began—</i>	
Average	9½ weeks
Earliest	4 weeks
Latest	20 weeks
<i>Duration Vomiting Before Therapy—</i>	
Average	3½ weeks
Shortest	2 weeks
Longest	12 weeks

The youngest patient in the series was seventeen years, the oldest forty-two. The average age was 32.8 years. There were twenty-one primiparae and twenty-nine multiparae. The average period of gestation at the time vomiting began was nine and one-half weeks, the earliest four weeks, and the latest twenty weeks. The average time they had vomited previous to treatment was three and one-half weeks; the shortest period two weeks, the longest twelve weeks.

One of the most striking cases in the series was a single woman, twenty-two years of age, who had vomited for thirty days following cholecystectomy. Intravenous glucose and saline, proctoclysis, nasal suction, sedatives of all types and practically every type of therapy recommended for the relief of vomiting had been used. Fifty rat units of an estrogenic preparation were given intramuscularly, daily for three days. The patient ceased vomiting and on examination it was discovered that she was about two and one-half months pregnant.

No claim is made for originating the use of estrogenic preparations in nausea and vomiting of pregnancy. Stein and Leventhal,³⁵ in 1928, reported good results in four out of five patients suffering from severe hyperemesis gravidarum. They also noted that amenorrheic patients

*Not available commercially. Supplied through the courtesy of Dr. Gregory Stragnell, Schering Corporation, Bloomfield, N. J.

treated for sterility with estrogenic substances did not vomit when they became pregnant. Stragnell,³⁷ in 1932, reported a series of fifteen cases with but two failures. In 1935, it was pointed out by the author that this type of therapy was frequently successful.¹⁶

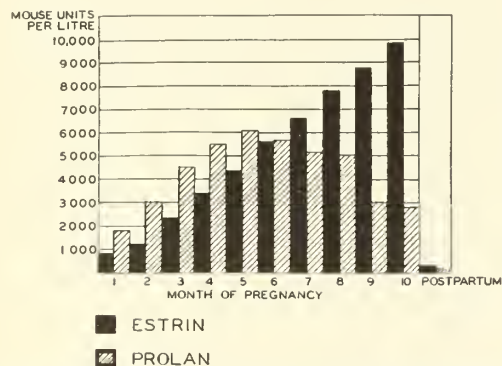


Chart 1. Comparison of estrin and prolan excretion in the urine during pregnancy. (Modified from *Clinical Endocrinology of the Female*, Mazer-Goldstein. W. B. Saunders Company, Philadelphia.)

The rationale of using estrogenic preparations in nausea and vomiting of pregnancy has not been definitely established. However, the association of estrin deficiency and the nausea and vomiting of pregnancy has been noted by Smith and Smith.³⁴ They found that the vomiting was associated with low estrin levels. Five patients, in their series, exhibited nausea and vomiting during the first trimester. A marked rise in estrin levels from low to high was synchronous with an amelioration of symptoms. The blood estrin content normally drops the first month or two of pregnancy. During the first two months the blood does not usually give a positive test for estrin. The estrin content of the blood then gradually rises until parturition.²⁶ The estrin excretion in the urine increases from a minimum of 600 mouse units per liter in the first month of pregnancy, to a maximum of 10,000 mouse units per liter at parturition⁴³ (Chart I). These findings, together with the clinical results obtained, would tend to show that a deficiency of estrin may be responsible for the nausea and vomiting of early pregnancy. It is possible that the high prolan level associated with the low estrin content may also be a factor. In normal pregnancy, a peak in the level of prolan occurs during the second, third, or fourth month, followed by a marked drop.³⁴ This drop in prolan and the marked rise in estrin coincides with the

time that the vomiting usually ceases (Chart 2).

The dosage recommended cannot be considered harmful and the possibility of producing abortion is remote. Robinson and his co-workers³¹ were unsuccessful in their attempts to produce therapeutic abortion in twelve women with

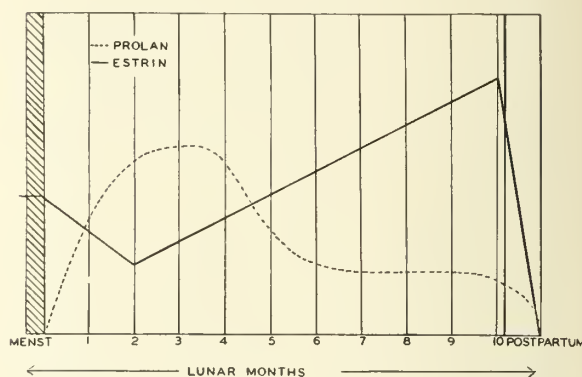


Chart 2. Variations in blood estrin and blood prolan during pregnancy.

large doses (50,000 to 6,800,000 international units) of estrogenic preparations from the seventh to the fourteenth week of pregnancy. They also reported that they had never noticed any ill effects either to the mother or child following the administration of this hormone.

The relatively high number of units excreted in the urine during pregnancy would make it appear that the dosage of estrogenic preparations used in the series was insignificant. However, the number of units excreted in the urine is far in excess of the number of units found in the blood serum and there is strong evidence to show that the two are not identical. The number of units required to produce a clinical effect in other conditions where estrogenic therapy has proven of value, is considerably less than the dosage calculated by experimental observations. It is possible, also, that we are dealing with a similar phenomenon as is found in amenorrhea with uterine hypoplasia. Kurzrok and Ratner²³ pointed out that the estrin excretion in many cases of genital hypoplasia is quantitatively the same as in normal women. It is necessary to build up the uteri to within normal limits by means of estrogenic preparations before they begin to respond again to the estrin supply of their own ovaries.

The various types of therapy recommended for the relief of this type of vomiting have a place

in selected cases. Foci of infection, uterine displacements, et cetera, may be an occasional cause for the vomiting and should be corrected. Estrogenic therapy cannot be expected to control vomiting due to these causes nor vomiting due to gallbladder disease or peptic ulcer.

Glucose solutions given intravenously are advisable, in conjunction with estrogenic therapy, in patients showing acidosis. However, the glycogen depletion of the hepatic cells is not the primary cause of vomiting, but is due to dehydration and starvation. The same pathologic changes found in the liver of patients dying with hyperemesis gravidarum can be duplicated experimentally by starvation and are seen to a lesser degree in certain wasting diseases.²⁸

The neurotic theory is probably applicable to a small percentage of cases. The vast majority of patients do not vomit because they want to, or for no reason at all. The fact that patients have been known to vomit even before the first period is missed would tend to show that the neurotic theory has been over-emphasized. Several of the patients in the series were given placebos in the place of estrogenic preparations. The administration of these inert materials did not produce a cessation of vomiting. Vomiting began again, in several patients, when inert materials were substituted for standardized products.

Kemp's²² results with adrenal cortex extract are difficult to explain through our present knowledge. The functions of the adrenal cortex are still much of a mystery. Britton and his co-workers^{6,7} maintain that the adrenals regulate carbohydrate metabolism and contain a sex stimulating or estrogenic hormone. Proof of these contentions may explain the beneficial effects of adrenal cortex extract in nausea and vomiting of pregnancy.

The series herein reported is not large, nor is it convincing. Further trial may not duplicate the uniform results obtained and time may disprove the contention that estrogenic preparations will control the majority of cases of nausea and vomiting of pregnancy.

Summary and Conclusions

1. The woman suffering from nausea and vomiting of pregnancy presents a much more serious problem than is generally realized.

2. The distressing symptoms of nausea and mild vomiting are frequently neglected. It is

difficult to determine when a mild case may become alarmingly severe.

3. The theories of etiology of nausea and vomiting of pregnancy are many and varied.

4. The types of therapy used are nearly as divergent as the theories of etiology.

5. Review of a series of fifty cases of nausea and vomiting of pregnancy is presented showing good results from treatment with estrogenic preparations in 96 per cent.

6. The dosage and effects on patients are given.

7. The theories of the rationale of using estrogenic preparations are discussed.

8. No definite conclusions can as yet be drawn from the small number of cases studied but a large percentage of good results in this group promises well for future reports.

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THE CHILD OF ANCIENT GREECE*

With Special Reference to the Pediatrics of Hippocrates

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GREECE has always held the predominant place in ancient history. It was from Greece that the sources of literary knowledge first flowed in a broad stream; it was in Greece that medicine was first put on a solid foundation. There was the cradle of eugenics, of philosophy, and of other branches of science. How did the child fare in this country?

As it is impossible to include all Greek knowledge concerning the child within the scope of this paper, I shall confine myself to the pre-Christian era. Most of my discussion will be devoted to the medical aspects of the subject, which are almost entirely covered by the *Corpus Hippocraticum*, Lycurgus and Plato will be considered for their work pertaining to eugenics, and Aristotle for his theories on heredity and the physiology of the newborn. Galen and Soranus, the pillars of later Greek pediatrics, will be omitted.

We have learned that it is insufficient to know only the anatomy and physiology, the pathology and therapy of pediatrics—the purely medical phases of the subject. We now appreciate the importance of the psychological and social factors concerned. Some space will be devoted, therefore, to the life of the child in ancient Greece, his social status, his education, and his pleasures.

The time of the Trojan War, as described in Homer's epics, was about 1200 B. C., and Homer

himself probably lived between 1000 and 900 B. C. Lycurgus is to be placed about 800, and the Law of Gortyna about 500 B. C. Hippocrates lived from 460 to 377, and Plato from 427 to 347 B. C.; thus Hippocrates was thirty-three years old when Plato was born. Aristotle was only seven years old when Hippocrates died; he lived from 384 to 322 B. C.

As the *Corpus Hippocraticum* supplies by far the greater portion of the pediatric knowledge given here, a few remarks about Hippocrates are not out of place. According to tradition, Hippocrates is the author of the Hippocratic collection of medical works, the *Corpus Hippocraticum*; nevertheless it has been definitely established that this collection is not the work of one man, but of generations of men. In its present form it was apparently collected and edited in the beginning of the third century B. C. This knowledge is not new; Erotianus, who lived at the time of Nero, recognized only thirty-one of the treatises as coming from the pen of Hippocrates, and Galen only thirteen. Later Hippocrates received credit for only two, and by some he is even denied credit for this number. At present, about six are considered to be Hippocrates' own work. The number of books contained in this collection has been variously estimated, usually as between fifty-three and seventy-two, depending upon whether some of them are considered as continuations of others. On the other hand, some were later divided,

*Read before the Ramsey County Medical Society, St. Paul, Minnesota, February 24, 1936.

like those on the eight-months and on the seven-months child, which apparently originally formed one book. The most popular number now is fifty-nine (Neuburger).¹⁴

Hippocrates, who really should be called "The Second," because his grandfather had the same name, was born and lived on the island of Cos. Many of the biographical stories about him are no doubt legendary. He became greatly honored even in his lifetime, and very early he became the shining light in medicine, the greatest of all physicians, the Father of Medicine. "He meant to medicine what Socrates meant to philosophy. Both represent the reaction of practical common sense against the overwhelming use of theoretical speculations" (Neuburger).¹⁴

Hippocrates apparently did not write a special treatise dealing with all children's diseases, but he did write a treatise which deals with a certain period of childhood, the period of dentition. It is called "On Dentition." This tract, however, does not deal exclusively with teething in infancy and childhood, in fact only seven of the thirty-two paragraphs do that; the rest deal with other pathological conditions, especially those of the throat. Some deal with the nutritional state of the infant, intestinal trouble, vomiting, etc. Several theories have been advanced to explain the purpose of this treatise. The most plausible seems to be the one claiming that dentition here means not teething alone, but all the ailments occurring during the teething period.

The "Aphorisms," probably the best-known treatise of the *Corpus Hippocraticum*, are of special value for us, as many of these aphorisms deal with children. There is a treatise "On the Nature of the Child," the title of which is misleading, as it deals with embryology. There are two treatises called "The Eight Months Birth" and "The Seven Months Birth," but it is questionable whether they are genuine, although it is agreed that they are of great antiquity. Besides this, children and their ailments are mentioned altogether in about two hundred places in the *Corpus Hippocraticum* (Ghinopoulou).⁷

Some of the embryological ideas of Hippocrates were as follows: The fetus sucks air and nourishment from the womb; the air is the same as that which the mother breathes, it gets into the heart of the fetus and is thus supplied

to all parts. Hippocrates believed that the fetus takes food in utero. "If anyone asks," he says, "how one knows that the child draws and sucks in utero, one may reply that when a child comes into the world he is found to have feces in the intestines, and human beings and beasts directly they are born pass this through the bowel; moreover, if the child has not sucked in utero he would not know how to suck the breasts as he does as soon as he is born" (Still).¹⁹ The number seven plays an important rôle in the development. In seven days the fetus has acquired all essential parts; forty hebdomads or seven-day periods (i.e., nine months and ten days) is the full time of pregnancy. The period of first dentition ends at seven years, or three hundred fifty hebdomads. The entire life is divided into seven periods, of which the first three are infancy, childhood, and adolescence (infancy here means the first seven years!). The significance of the number seven through the ages is well known. Even now many people think that our bodies change every seven years. This theory that the number seven has a special significance neither originated nor ended with Hippocrates.

Aristotle taught that after conception an undifferentiated mass develops, but that after forty days one can recognize in a male embryo in an abortive egg all limbs and the genitalia. In a female embryo no differentiation is noticeable even after three months, but after four and one-half months it begins to develop rapidly and soon catches up with the male. It also was his theory that the menses rise to the breasts and there change into milk.

There was more than one theory on heredity. Empedocles, Democritus, and Hippocrates thought that the male as well as the female has a seminal secretion. On this precept they built a theory of preformation. This theory was repudiated by Aristotle, and later he was upheld by Galen. Aristotle claimed that the greater likeness of the children to one or the other of the parents arises from the battle of the potentialities contained in the sperm and the menstrual blood, respectively. He thought that the uterus is filled with blood and that some kind of coagulation takes place when the sperm enters. He opposed the theory, originated by Pythagoras, that the semen derives material from all parts

of the body, that it is a kind of an extract of it.

Plato looked at the problem from a more practical standpoint. He claimed that the good results obtained in breeding cattle selectively for quality should be an impetus to try the same with human beings. It is not enough to educate the child properly; he must be properly born of select, healthy ancestry. He advocated permits for marriage. Men should procreate only between the ages of thirty and forty-five, and women between twenty and forty. He also proposed laws for the destruction of children born under circumstances contrary to his views. Similar ideas governed the laws of Lycurgus some centuries earlier.

Aristotle was the first to deal more intensively with the physiology of the newborn (Still).¹⁹ For human beings and animals it is natural to be born head first. Human children have their hands pressed against their sides, but as soon as they are born they cry out and put their hands to their mouths. The infant does not cry until it is entirely born, even if in the course of a prolonged labor the head is born, and the body retained for some time. Evacuation of the bowel takes place at once or soon post partum, but always within the first day. The meconium is "like blood," very black, like pitch, but soon the evacuations become light because the infant nurses at once. For the first forty days the baby does not cry or laugh when awake, but he does both at times in his sleep. The newborn sleeps most of the time and usually does not even awake when tickled. The older he is the more he is awake. He had no doubt that even young infants dream, but that it is quite a long time before they remember their dreams. He stated that all newborn have blue eyes, later changing to their destined color.

Aristotle considered the division of the cord the province of the nurse. A woolen string was used for tying. When the cord is tied, it grows together and the adjoining part falls off. If the knot becomes untied the child dies of hemorrhage. It was the usual thing to wait a little and to tie the cord after delivery of the placenta except in cases where the placenta was not delivered for some time.

Prematurity was apparently a subject of great interest to the ancients. In Hippocrates' treatises on "The Seven Months Birth" and "The Eight Months Birth" is expressed the very ancient

idea that the eight months child is much inferior to the seven months child. There is even the definite statement that none of the eight months children remain alive. The reason given is that there is a very dangerous period of forty days around the eighth fetal month, during which the fetus undergoes many kinds of ailments. Any child born in this period has no chance to live. The seven months child, on the other hand, may live, as it may be born before these diseases attack it, but even this child rarely remains alive. A child should be born at the end of the ninth month, and the so-called ten months child, that is one born after seven times forty days, is the very best, as it has had time to get over the supposed diseases in utero. Aristotle wrote that in Egypt it was claimed that eight months children may live, even if they are misshaped. This does not hold true for Greece, however, for if such an infant lives there the mother must be mistaken in her reckoning. A seven months premature baby that lived is mentioned even in Homer's *Iliad*.

Hippocrates mentions several signs indicating the condition of the fetus in utero. Flabbiness of breasts and abdomen and drying up of milk point toward death or lack of vitality. Hippocrates knew asphyxia of the newborn and advised against cutting the umbilical cord until the child cried or passed urine or sneezed. The child should be kept very close to the mother, probably for warmth. Aristotle also describes the pale, almost dead, asphyctic newborn. He tells that some nurses were particularly skillful in dealing with this condition; they squeezed the blood from the cord into the child and after that the pale child, which had been apparently drained of all blood, came to life again.

All kinds of congenital anomalies were known, such as polydactyly, congenital clubfoot, and luxation of the hips, situs viscerum inversus in animals, and hermaphroditism in human beings. Aristotle claimed that male children show such anomalies more often than female. He did not believe that maternal impressions cause monstrosities, and in this he was hundreds, if not thousands, of years ahead of his time. He said that there must be a physiological explanation, and he appealed to comparative embryology to solve the mystery.

Aristotle mentions the difference in the pro-

portion of the body in the infant and in the older child. According to him, the child starts to cut teeth in the seventh month, but occasionally it is born with teeth. Some get the upper teeth first, some the lower. He described the large fontanelle and claimed that it ossified later than any other bone. The rapidity of growth depends on the heat of the milk with which the child is nursed.

Homer notes that the nurse bathed the child in water immediately post partum, and wrapped it in rich swaddling clothes with golden bands; but we must not forget that Homer describes the aristocracy rather than the common people. At the time of Lycurgus, water was not used as in most countries, but the child was bathed in wine to prove its constitution. The idea was that epileptic and weakly babies would waste upon being thus treated, while the strong ones would become firm and tempered like steel. The law in Sparta required examination of the newborn by the elders. Well-shaped babies were raised, misshapen ones exposed. No swaddling clothes were allowed in Sparta, a singular achievement for the time; the children had to grow up free and unrestrained, and swaddling was considered a means of softening the infant. This, however, did not become popular in all parts of Greece. The Thessalians, for instance, had a special method of swaddling. A pillow filled with straw was put on a board that was like a shallow tub, the child was wrapped in linen and bands up to the hips, placed on the pillow, and tied down with straps pulled through special holes in the board (Soranus).¹⁸

Hippocrates has little to say about the care of the newborn. He advises that very small children should be bathed in warm water for a long time—very correct advice for probably premature infants. Not quite so correct is the advice to give them diluted warm wine to improve their color and to prevent convulsions. Some kind of wrapping-diapers are mentioned in one book. It was the custom almost always to place newborn babies in some type of cradle. Homer (Körner)¹⁹ mentions a shield or a shoe-shaped cradle with two handles, or a winnowing basket; the latter was sacred to the gods and was regarded as a symbol of future wealth and prosperity. As the warlike Spartans wanted to condition their offspring very early,

they used shields to take the place of cradles.

It is strange that Hippocrates says little or nothing about wet-nursing and the diet of nursing mothers and of wet-nurses—subjects which are considered at great length in all later Greek authors. For this reason it seems very probable that the collection is incomplete. Artificial infant feeding is not mentioned in the entire collection. Hippocrates claims that hard water reduces the amount of breast milk and he knew that when one woman's milk does not agree with an infant, another's may do so. The nurse's diet is considered in one passage, in which he declares that her faulty diet was the cause of lithiasis in infants. This is about all the *Corpus Hippocraticum* offers on the question of infant feeding.

In Homer's time, or in the time he describes, mothers usually nursed their babies, though occasionally wet-nurses were employed. Odysseus himself had been nursed by Eurycleia, whom his father had bought for one hundred cattle. Later she rose to high rank in the household. The wet-nurse had to suckle the infant until he could be fed honey and the juice of figs. The law of Lycurgus forced the Spartan mothers to nurse their babies. Nursing mothers were honored; they were greeted wherever they appeared and offered seats. How important nursing was considered is shown in the following story, though it may be only a legend: The seventh king of Sparta had two sons; the younger was chosen as his successor because the older had not been nursed by his mother, the queen.

At the time that Athens had reached the height of its power, wet-nursing became more prevalent, Spartan nurses being especially chosen because of the supposed beneficial influence of their sturdy natures. At first only the rich found nursing burdensome, but soon wet-nursing became almost universal. Usually slaves were used as wet-nurses. At times, respectable free women were forced by poverty to do this work, although many wet-nurses were of very doubtful reputation. At times a very nice relationship developed when the nurse stayed on in the household and took care of the older child and later became the confidante of an older girl or even attained the responsible position of housekeeper. Poetry and art give many ex-

amples of such relationships, and there are several gravestones dedicated to such faithful nurses. Many terra cotta figurines show women with nursing infants.

In agreement with Hippocrates, Aristotle attributed diseases of infancy to faulty diathesis of the nurse. Probably neither of the two is original in his opinion, but this is no doubt an idea which was ancient at the time of Hippocrates and Aristotle. Although we find nothing on artificial feeding in Hippocrates or any other Greek author, there is no doubt that it was practiced. Heinrich Schliemann,^{16,17} who excavated the site of ancient Troy about sixty years ago, found several small vessels with spouts which he thought were used for feeding infants, and recently more were unearthed at the same spot.¹ There are other vessels preserved which no doubt were made for this purpose, some of which are shaped like teapots,³ others like urns. Some have sieve arrangements on top to keep out coarse contamination, thick scums, and the like. After a year the child received some broth made of pulse, sweetened with honey; then barley, porridge, and goats-milk. Hippocrates recommended diluted wine for children, but Aristotle condemned it. Our information concerning the diet for young children is very meager.

Our knowledge of pediatrics proper, the pathology and therapy of children's diseases, over two thousand years ago is almost entirely drawn from the *Corpus Hippocraticum*.^{6,7,19} Aristotle's remark that the majority of infants die before they finish the first week of life gives us a deep insight into infant mortality. The philosopher points out that infants usually were not given names until they had reached the age of a week, when there was some hope of saving them.

Nutritional disturbances in infants are considered in greater detail by Hippocrates than by any other ancient medical author, but the basis for many of his ideas is difficult to understand. He knew that the mother's physical condition often influences the fetus, as a weakly child is usually born of a sickly mother, one who suffers from fever, urinary disturbances, etc. The viability of the newborn is mentioned about twenty times. The treatise on dentition deals with feeding and nutrition in ten places,

e.g.: "Children who are well nourished by nature do not nurse a quantity of milk corresponding to the increase of flesh." "Children who have large evacuations and good digestion are the healthier, and those who have small evacuations and know no limits [in their eating] are not nourished in proportion and are sickly." He knew that the various ages have different dietary requirements, because "the growing organism has the most innate heat, and therefore requires more nourishment." In a famous aphorism he tells that elderly people bear fasting well, but infants fast poorly, especially those of a lively disposition. There is mention of some dysentery with sleepiness; this might be intestinal toxicosis or cholera infantum, but for the low mortality. The crisis is on the eleventh day. Liquid diet he considered proper in all febrile diseases, especially in children.

Hippocrates held the influence of age, constitution, and season of the greatest importance upon the origin and course of disease. Four of the aphorisms deal with the diseases prevalent at the different ages. "The diseases of infants are: aphthæ, vomiting, wakefulness, nightmares, inflammation of the navel, discharges from the ears." At teething time, children often suffer from pruritus of the gums, fever, convulsions and diarrhea, especially when cutting the canine teeth and particularly in fat, constipated infants. "A little later there are tonsillar infections, crick of the neck, asthma, calculus, round and other worms, pedunculated warts, scrofula, tumors about the ears and elsewhere" (probably adenitis), and urinary difficulties. "At the appearance of puberty, epistaxis and chronic fevers supervene," besides the diseases just mentioned. "As to the ages," he says, "the youngest ages are the most susceptible to disease." In discussing the influence of seasons, Hippocrates declares that "children are more comfortable and healthier in spring and early summer." "Most diseases," he claims, "come to the crisis within forty days, some within seven months, some within seven years, others when the individuals reach maturity. If boys are not cured by fifteen years and girls not by the time they begin to menstruate, they will continue [with their sickness] all their life." The age of the patient should be considered when making the diagnosis and the prognosis. Hippoc-

rates claimed that the constitution of an individual does not change—which sounds quite modern. He knew of the late appearance of menses in colder climates.

Rachitis is not mentioned in the entire *Corpus Hippocraticum*, and there is no condition described which may be diagnosed as such. The kyphosis that Hippocrates describes is probably of tuberculous origin. In Homer we find a figure by the name of Thersites, a kind of court jester, who had bowlegs, was hunchbacked, and had a deformed chest.⁵ Many authorities considered these severe deformities due to rickets, in spite of the fact that the jester was lame on one foot; this lameness, however, may have been due to skeletal deformities. You probably remember the bust of the immortal writer of the well-known fables, Æsop. He was a hunchback, and he showed marked deformity of the entire thorax. It is possible that he was a severely rachitic individual in early childhood. In Plato we find a passage which seems to point to the fact that rickets was known in ancient Greece. He proposed that nurses should be compelled, under heavy penalty, to carry children until they are able to stand, and even then care should be taken that the children's limbs are not distorted by too early weight-bearing; they should be compelled to carry the children until they have completed the third year. So far, no evidence of rickets has been discovered in the excavated skeletons of ancient Greece.

Here may be inserted the question of dentition. Only seven paragraphs in the treatise bearing this name are devoted to the subject. Some seem rather strange. "Those who have acute fever during dentition rarely have convulsions." "Those who cut the teeth in winter get along better if the conditions otherwise are the same." Hippocrates knew that "not all children die that have convulsions during teething, many stay alive," et cetera. Of mouth diseases, noma is carefully described. Of ear diseases, otitis with earache is described, and delirium is considered a dangerous sign. In those with ear discharge, the prognosis is better. Hippocrates knew mastoiditis. Eye diseases in children are mentioned here and there. Nyctalopia (day blindness) attacks children and youths; it heals spontaneously, in some in forty days, in others in

seven months, or it may even last a year. Hippocrates knew trachoma, acute and chronic conjunctivitis, sties, and others. In other words, he was familiar only with external eye diseases, as can be expected. Among the tablets found in the Asklepæion of Epidauros, one deals with a blind boy who was healed by being licked by a dog. A diagnosis is not easily possible.

Diseases of the throat, usually of an ulcerative type, are frequently described. Hippocrates distinguished mainly two types: a milder one, the synanchis, is probably a nasopharyngitis; and a severe, malignant one, the kyanche, probably diphtheritic croup.⁷ He considered children after the period of dentition particularly susceptible to throat infections. "If the child is able to swallow," says one passage, "he will recover from the tonsillar ulcerations." If not, the disease will prove fatal (this is probably a peritonsillar abscess, and not a diphtheritic paralysis, which, by the way, apparently was known to Hippocrates). Many other passages could be quoted, but they are of less importance. Tonsillitis and what we consider to be quinsy were treated with warm compresses; incision of the abscess in the throat is mentioned, though not specifically in children.

Of respiratory diseases, we find asthma in children mentioned briefly. A cough usually was the whole clinical picture of a respiratory disease. Children develop coughs especially in March, when the so-called "Bird Wind" blows, a cold north wind that frequently springs up at the time the birds begin to return from Africa. This was the reason that March was greatly feared. It is interesting to know that Hippocrates recommended for the treatment of coughs an eggnog-like drink containing, among other ingredients, egg yolk and honey. When breathing was difficult he prohibited baths, just as many of our mothers refuse to bathe children who have colds. There is a description of empyema in a child whose chest was opened by means of a cautery. Strange is the history of two older boys who were attacked by a dry, violent cough; a paralysis of the right hand occurred, after which the cough stopped.

Circulatory diseases are very poorly dealt with; since sufficient anatomical and physiological knowledge was lacking, heart diseases were practically unknown. Hippocrates thought that

the heart was too tough an organ to become diseased or cause pain.

In discussing diseases of the intestinal tract, Hippocrates declares that diarrhea often complicates teething, but that constipated children have more trouble from teething. Parasites are well described; he mentions the round worm, the ascaris, and the flat worm, the tenia. The tenia originates in utero, because at times the grown parasite is found very early post-partum with not enough time to allow for such development. Round worms reproduce themselves, but teniæ have no young. The tenia is as long as the intestines; purging produces only part of the worm, pieces of which may be passed with the stool or even when walking. All of this sounds unusually modern. Hippocrates thought, however, that the worm impinges against the liver, causing dribbling, aphonia, jerking sensations in the abdomen, and pain. He describes prolapse of the rectum occurring from diarrhea or passing a calculus in children. He recommends the following treatment: replace the rectum with a soft sponge, the child being suspended in a certain manner. In obstinate cases the rectum is moistened with some decoction and (after replacement) the anus is compressed by means of a bandage passing around the abdomen and between the legs. At stool the child sits with its back against the mother's knees, its feet upon her feet.⁶ Dysentery is described with fever, peculiar multicolored stools (probably containing blood and pus), anorexia and thirst. The mortality from this disease was high between the ages of five and ten years. Constipation is treated with goats' milk and honey, or flour-water with honey and olive oil, and also with enemas and suppositories.

Urinary diseases are mentioned in some of the earliest medical records relating to children. We find them noted in some of the oldest Egyptian papyri. Calculus apparently was more prevalent in ancient times, and Hippocrates mentions it often; older children develop stones in the bladder on account of the heat in that organ. Such children rub and pull their genitals because they think that the obstruction is there. It is much rarer in girls because of the shorter and wider urethra and because they supposedly drink more water. One of the causes is unhealthy milk. A preventative is wine, much di-

luted. There are five cardinal symptoms: pain on urination, emission of urine drop by drop, bloody urine in cases of ulceration of the bladder with reflex pains in the prepuce, and occasionally passing of gravel. Among the tablets found in Epidaurus there is one dedicated to the cure of lithiasis in a boy. Hippocrates knew cystitis with fever, which often was fatal. Besides the cloudy urine and diarrhea or constipation, there was pain in the bladder region.

As to the genitals he made one blunder, but the same was made much later; he considered the hymen a pathological product. Hippocrates was the first to describe the orchitis complicating mumps. He knew the hydrocele, or "dropsy of the testicle" in little children, and taught, properly, that it often disappeared spontaneously.

Skin diseases are mentioned fairly often, but at times it is very difficult to come to a definite conclusion as to the diagnosis. Hippocrates mentions herpes, pityriasis, erythema, erysipelas. Skin diseases are the result of the deposition of the *materia peccans* in the skin, i.e., they are caused by internal ailments. This deposition in the skin is a natural healing, and one should not interfere with it or the deposits may be "driven inwards" and aggravate the underlying trouble, an idea which is still prevalent. From this theory are derived the names: *exanthema* = blossoming; *ektoma* = efflorescence; and *ekthyma*, the root of which means to break forth.⁷ A toxic erythema or urticaria is mentioned in a case of dysentery; the rash soon disappeared, and there was also swelling next to the ears, which, too, soon disappeared.

Of infectious diseases he knew diphtheria. Several aphorisms apparently deal with it, and in the treatise on dentition he mentions spider-web-like coverings on the tonsils besides ulcerations, which were considered unfavorable. The following is an important passage: "Ulcerations on the tonsils that spread about the uvula usually alter the voice of those who recover." Brettonneau did not consider the evidence sufficient for a definite diagnosis, but at the present the alteration of the voice is considered a post-diphtheritic paralysis of the soft palate. Hippocrates gives an excellent description of an epidemic of mumps on the island of Thasos. Often a simultaneous swelling of the testicles was noticed.

We may suspect typhoid fever in a disease with meteorism, swelling of the spleen, and yellow stools, which lasted three weeks. There was abscess formation during the convalescence. Dysentery was described before. Tetanus is mentioned several times.

Tuberculosis is represented by what apparently is Pott's disease, and perhaps tuberculous arthritis. In speaking of kyphosis of the spine, he says: "Those who acquire it before puberty from asthma or cough will die."

Neurology is treated at length, an entire treatise being dedicated to epilepsy alone. "The grownup epileptic has the aura, and when he feels the spell approaching, he hides somewhere because he is ashamed; a child will fall down at first, but later he learns to recognize the aura and runs to the mother or another person he knows well, because of fear and terror, not because he is ashamed, as the sense of shame is not yet developed in the child." The cause is a congestion of the veins by phlegm, which is not carried off properly. Only in a phlegmatic constitution does epilepsy appear. A certain purification of the brain takes place in utero, toward the end of pregnancy, by giving off phlegm. After birth, sores on the head help in this cleansing process, also dribbling. This may suffice as the etiological explanations are very lengthy and of no further value to us. Localized collections of phlegm are thus responsible for the convulsive seizures of certain limbs, the mouth, eyes, et cetera. Little children die easily. Hippocrates was probably the first to reject supernatural causes which gave the disease its name, "*hiera nosos*," "*morbis sacer*," the sacred disease, and he also recognized it as a cerebral affection. He distinguished it from convulsions of other origin, although, like most medical authors after him, he was not quite sure where to draw the line of distinction, but that would be asking too much. He apparently knew that epilepsy is hereditary. He considered it curable before puberty, but not afterwards; the cure is brought about by changes, such as age, location and mode of life. Very interesting is a passage stating that epilepsy and quartan fever are not compatible, that patients suffering from quartan fever do not develop epilepsy and if an epileptic develops this fever he will be cured.

Convulsions in children are mentioned often. He recognized the relation of fever and convulsions and knew that they do not always prove fatal. Besides fever he noted, as causes, constipation, wakefulness, and fright. "They occur most readily in children from just after birth up to the seventh year. Older children and adults are much less prone to develop convulsions, unless a violent, fatal disease with delirium is present." He mentions convulsions during dentition, several times.

Hippocrates was the first to give a perfect description of breath-holding spells, although he related it to epilepsy. "The onset may be from some mysterious terror or fright from somebody shouting, or in the midst of crying, the child is not able quickly to recover his breath, as often happens to children; but when any of these things happen, at once the body is chilled, he becomes speechless, does not draw his breath . . . the blood is at a standstill . . ." (Still).¹⁹

He was also the first to mention cerebral palsy in children: "When weakness is left," he claimed, "the spells frequently do not recur" (as they do in epilepsy). He described atrophy following paralysis, also as consequences of disease of the spinal cord. He also seems to have known lethargic encephalitis, and he was well aware of the fact that in head injuries the convulsions occurred on the contralateral side.

Aristotle discusses a condition called ischnophonia, seen particularly in young individuals, where the patient cannot put the syllables together fast enough—probably stuttering or stammering.

An interesting case is reported in the collection from Epidaurus. A boy who had lost his voice went there to recover it. After offering the initiating sacrifices and going through the usual procedures, the official who carried the fire for the temple sacrifices looked at the father and said to him: "If you accomplish your purpose, will you pledge yourself to give this temple, every year, a certain sum in grateful memory?" And before the father could say anything, the boy answered in the affirmative and was cured of his affliction—no doubt a hysterical mutism.

Hippocrates' surgical experience must have been enormous, as even among children the variety of conditions upon which he reports is remarkable. There are some excellent case

histories of head injuries. A boy was hit on the head with a broken pot thrown by another child. On the twelfth day fever developed, caused, as Hippocrates thought, through irritation of the wound produced by washing it. The edges became swollen and the skin seemed to become thin in all directions. Trepanation was performed, but no pus was encountered. There seemed to be evidence of imminent suppuration in front of the ear on the same side though there was no real breaking down. Later suppuration of one shoulder developed. Death occurred on the twenty-fourth day. This was, unmistakably, a case of pyemia following wound infection.

A twelve-year-old girl received a head injury when a door was slammed in her face, fracturing her skull. The fracture involved some sutures. Trepanation was done, but as it was done poorly, suppuration took place. On the seventh day she had a chill, then fever and chills for eight days. The trepanation was repeated, but only a little blood and pus were found. The girl became somnolent and high fever continued; finally left-sided convulsions (the wound was on the right) and exitus occurred.

Hippocrates reports an abdominal injury from a mule kick, followed by rapid respiration, unconsciousness, fever, and exitus on the fourth day. It is hard to make a definite diagnosis, but here, as in the previous cases, we must admire his honesty in reporting them.

He mentions suppuration of the parotid glands, in some cases three days post partum—our suppurative parotitis of the newborn. Gangrene of the mouth, noma, was well known. One boy lost the lower and upper front teeth and part of his jaw. Hippocrates noted that at times part of the palate is destroyed and that the tip of the nose becomes flattened when the upper front teeth fall out.

Several orthopedic conditions are well dealt with. Pott's disease was mentioned. Hippocrates described suppurative arthritis in hip and shoulder, with pathologic luxation. Two cases of suppurative arthritis in children occurred late during some disease with a dry cough and digestive disturbances—perhaps of tuberculous origin. He seems in his proper element when describing various luxations and their treatment. He described congenital hip luxation, congenital anomalies of the spine, and clubfoot. About

the latter he said: "In congenital clubfoot a cure usually can be brought about if the treatment is started early." When the child wears shoes, they should be of a type which, judging from the etymology, were used for walking in very muddy streets. Such shoes probably grasped the foot up to the ankle. Another kind recommended was the so-called Cretan shoe, a sandal fastened to the foot by leather straps reaching as far as the middle of the leg, higher than usual.

Sufficient evidence has been produced to show that in pediatrics, as in other branches of medicine, Hippocrates was a master physician and was far ahead of his time. We can justly apply to him his own words: "Old medicine should not be thrown overboard as if it never existed . . . because it is not perfectly correct in everything. No, the opposite should be done; because it comes so close to the truth we should still consult it and admire its discoveries in spite of the many errors."

One would think that in Greece, where art, poetry, and philosophy were developed to unsurpassed heights, children would be given all the care and consideration that might be expected of a highly civilized nation. That this was not so is excellently expressed by Payne¹⁵ in his outstanding work on the history of child welfare: "The theory that philosophy and religion go hand in hand with humanity is shattered by the fact that Plato, Aristotle, Confucius and Gautama affected apparently not a single jot the ancient attitude of indifference toward the undesired children." And again: "While the Greeks treated women well, yet with the exception of the single province of Thebes, infanticide was common in all Greek states."

It is true that in the two great poetic works of Homer, evidence of cruelty toward children cannot be found except perhaps in the story of Hephaistos, the heavenly smith, who claimed that his mother tried to conceal him because he was lame. Much has been written on this apparent discrepancy, because humanity in such a degree is not apparent in Greece from Homer down to the Christian era, a period of about a thousand years. Practically every Greek colony had a legend of a hero who had been exposed there, and Greek mythology is full of similar stories. Even Jupiter was such a victim, and was saved by a goat that nursed him. I am

sure you are familiar with the laws of Lycurgus, ordering the exposure of all weakly and deformed children in a chasm beneath Mount Taygetus. Lycurgus practiced eugenics "without regard for conventional morality."¹⁶ "Children were not so much the property of their parents as of the whole commonwealth" (Plutarch). Plato considered only eugenics, and infanticide, as far as it fitted into his theories, was in no way objectionable. Of actual laws concerning the child, besides those of Lycurgus, I want to mention the laws of Gortyna in Crete, which date from about 500 B. C. and consider the social status of the child, particularly the right of the father over life and death of his child.

Even more evidence of cruelty toward children, particularly the newborn, we find in many ancient literary works. Besides economic pressure, all kinds of reasons were used to get rid of unwanted offspring, for instance, doubtful parentage. Many a mother tried to counteract the forced exposure of an infant dear to her heart; near the child she left a pot or crock containing money and jewelry, hoping that some poor people would have pity on the infant when they found the valuables. The jewelry also might serve for later identification. This was, of course, a splendid theme for many dramatists, and the appearance of the supposedly dead child, now grown to manhood, and the highly dramatic identification made an ideal fifth act.

One of the economic reasons for restricting the number of children was the desire not to split up the estate into too many parts. The province of Thebes alone condemned exposure by law. Ælian wrote about it as follows: "This is a Theban law, most just and humane: that no Theban might expose his child or leave it in a wilderness, upon pain of death. But if the father is extremely poor, the law requires that as soon as the child is born, whether it is male or female, it must be brought in the swaddling clothes to the magistrate, who, receiving it, delivers it to some other for a small reward, conditioning with him that he shall bring up the child, and when it is grown up, to take it into his service, man or maid, to have the benefit of its labor in requital for its education" (Payne).¹⁵

But besides economic or other somewhat dramatic reasons, there prevailed at times an inexcusable cynicism in regard to children. "There

is nothing unfortunate in being a father unless one is the father of many children," declared one writer. A Greek poet said: "Nothing is more foolish than to have children." A philosopher said: "To raise children is an uncertain thing, success is attained only after a life of battle and disquietude" (Payne).¹⁵

In spite of all this there is a brighter side. Children who were kept were treated well and were given every opportunity to develop into young people who would be the pride of the country. The Greeks seemed fond of the children they decided to raise. There are many figurines showing dandling, bathing, and fondling of infants.²⁰ Homer delights in describing rich swaddling clothes and cradles, and Aristotle speaks of lullabies for babies.

In Sparta the early education of the child was rather strict. Children were fed simple food. They grew up without fear of the dark or of being left alone, and were not spoiled. To show pain was considered a disgrace. The Spartans had a definite plan in conditioning the entire youth for endurance, starting at a very early age. Up to seven years, male children were kept with the women, from seven to eighteen they were called "boys" and underwent a strict routine. Their education was mainly physical, consisting of training in running, leaping, wrestling, boxing, and other athletics, and was conducted in the gymnasium. Dancing and military exercises finished their education. At certain festivals, flogging of boys was practiced to show their endurance of pain. Girls, too, wrestled, ran races, threw quoits, cast spears, and danced in the nude in public. There was no prudery in their upbringing. Lycurgus thought he could produce heroic minds in youths by the practice of music.

In Athenian Greece the boys were sent to school at seven, usually escorted by a pedagogue, a male slave with some education. They were taught reading, writing, and arithmetic, drawing, music, and simple geometry. Physical culture was held in high esteem; wrestling, running, and spear throwing were taught. There were special races for boys at the Olympic games. At eighteen, boys were enrolled in the city tribe to which they belonged and usually became soldiers.

Aristotle and Plato were much concerned with

the mind of the growing child; both suggested censorship of fairy tales and legends so that immoral and pernicious parts might be omitted. Children were taught reverence for their elders, probably an inheritance from the Egyptians.^{11,12}

The saying that "all work and no play makes Jack a dull boy" is by no means new. Aristotle and Plato pleaded very urgently that one has to rest in order to work with renewed strength, and play gives the mind rest and entertainment. Plato, therefore, considered games necessary in order to make children strong for real life; if supervised correctly, he said, games are good for the body and the intellect. He believed that the state should supply playgrounds and supervise games. You see we are not so very far ahead of him.

What games did Greek children play? Very popular were ball games, which surely go back as far as Homeric Greece. There was one such ball game that was called Urania, from the Greek *eis ton uranon*, "to the sky." Perhaps it was the game in which one player throws a ball very high while another jumps in the air and tries to catch it before he touches the ground. In one game the loser had to carry the winner on his back and was called an ass. The fact that the Greek mind is very inventive is illustrated by the variety of games that these people played. The Greeks used hoops, peg-tops, the see-saw, the swing, the kite, the hobby horse, and the go-cart. That a game similar to hockey was played is shown in a well preserved relief. The game that apparently was dear to every child's heart was that played with the astragaloi, the knuckle-bones of sheep. We find it frequently represented on vases. It was similar to our game of "jacks." There were many other games that were free from exertion, such as dice, checkers, draughts, and parchesi.

The Greek child did not lack toys. Many examples have been found, showing us how the children of ancient Greece played. In the ruins of Troy¹⁶ several rattles were found, some of

human form. Later rattles were made in the form of pigs. There are many figurines of different animals, especially horses, and no doubt some of them served as toys. Children played with dolls, some of which were rather crude, but others were jointed and exquisitely executed dolls which would gladden the heart of any modern child. Evidence that children had live pets is shown in the pictures on many ancient vases.^{2,3,9}

The pediatric achievements of ancient Greece go hand in hand with the other medical achievements of the time. The social status of the child was far from our conception of the child's status in a highly civilized nation. But education was relatively well developed and the seeds of certain ideas of child psychology and child management, of which we are so proud, are to be found in the time I have tried to bring nearer to you.

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CASE REPORTS

PITUITARY BASOPHILISM WITHOUT ADENOMATA ANYWHERE*

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A WOMAN of forty-four entered the hospital, February 11, 1935. She gave a history of polydipsia, polyuria and glycosuria since May, 1934. Hirsuties requiring depilators had developed since January, 1934, and there was obesity of many years duration. Dyspnea, orthopnea and edema of the ankles had existed for six weeks. She had pain in her left hip at times. She had had one attack of muscular spasms of the extremities without loss of consciousness.

Her past history entailed mumps, measles, smallpox and chickenpox as a child, diphtheria at nineteen, and pneumonia at thirty-one. At twenty-one she had submitted to an appendectomy and right ovariectomy. There had been vague headaches and discharges from the left ear when she had a cold. She began her menses at fourteen, which were regular with dysmenorrhea. She was married and had a daughter twenty-one years old. Her husband is living but not in good health. She had been amenorrheic for one year. Her family history is negative.

Physical Examination.—Her height was 5 feet 1.5 inches, her weight 192.5 pounds. She had a characteristic moon face of reddish cyanotic hue. There was a growth of hair on the face, excessive under the chin. The skin was dry, especially on the face and upper extremities. The neck was thick and short, the body was fat, while her arms and legs in proportion were rather thin. The breasts were heavy and pendulous. The abdomen was protuberant and fat, with purplish striae on the sides and brownish striae over the lower portion. There was a healed operative scar in the right lower quadrant and no masses nor organs could be made out. The lungs were clear. The heart was enlarged to the left; no murmurs were present, with a blood pressure ranging, during her stay of 104 days, from 210 millimeters of mercury systolic and 130 diastolic to 140 systolic and 92 diastolic. The neurological examination was essentially negative. Gynecological examination reported a normal pelvis. Her eye grounds showed moderate hypertensive changes. There was no aural discharge on the left. No audiometric readings were made.

Laboratory Studies.—The urine showed marked glycosuria. The hemoglobin ranged from 70 to 80 per cent. Her reds averaged 3,800,000, her whites showed a leukocytosis, at times, up to 15,000 and 20,000. There was marked hyperglycemia. Her sugar tolerance curve showed delayed return. The Friedman test for pregnancy was negative. Her calcium and phosphorus levels were normal. Her cholesterol level was 327.9 mgm., her chlorides 519.5 (2-27-35). Plasma protein was 5.83, of which albumin read 3.48, the globulin 2.35. Potassium (2-27-35) and sodium estimations were 14.7 and 361.9, respectively. The CO₂ combining power of the plasma was always above the normal, ranging from 84 to 104 throughout her stay. There was no free hydrochloric acid with histamine.

*Presented before the Minnesota Society of Internal Medicine, Nov. 11, 1935.

X-ray studies revealed a moderately enlarged heart to the left, pleural thickening on the right side. Pelvic bones, femurs and vertebrae appeared normal. The sella turcica showed a distinct rarefaction of the dorsum sellae. There was no evidence of enlargement. Her perimetric estimations were normal. Intravenous pyelograms showed normal kidney shadows and there was no evidence of any abdominal tumor. The mastoid shadows revealed a chronic sclerotic bone on the left.

She was placed on a 780 caloric diet with 110 units of insulin per day. This gradually controlled her glycosuria. At the terminal period of her stay she was on 1,100 calories per day with 35 units of insulin per day. At no time did she show any ketosis. Her cardiac incompetence cleared under rest. The high CO₂ combining power without any clinical evidence of alkalosis was due to some unexplained mechanism. Insulin increased the alkalosis. Sodium and cortin had no effect. Giving potassium chloride increased the chloride and potassium to normal. Following the unadvised extraction of a tooth, the patient developed a hemolytic streptococcemia and died in two days.

The post mortem findings¹ can be summarized:

Dense pleural adhesions on the right. The heart weighed 400 grams. Coronaries were soft and patent. The lungs showed a terminal bronchopneumonia on the left. The liver weighed 1,900 grams and showed a fatty cast. The gallbladder was thickened and contained six small stones. The gastrointestinal tract was negative. The pancreas weighed 80.2 grams—no adenoma present. The left adrenal weighed 14 grams, the right 12.4 grams. No definite adenoma on the gross. Each kidney weighed 250 grams. There was cloudy swelling. The capsules stripped readily. They showed a few hyaline glomeruli and there was a mild degree of arterio- and arteriolar sclerosis.

The right ovary was not found. The left ovary weighed 7.4 grams and showed no tumors. The uterus measured 7 x 6 cm. and was not myomatous.

Thyroid weighed 19 grams and showed no hyperplasia or adenoma. The follicles appeared normal. Attached to the posterior capsule were two ovoid bodies about 3 mm. in the long axis. These proved to be parathyroid on microscopic section and showed large fatty cells, nests of pale and dark oxyphilic cells. Chief cells occasionally contained fat droplets. There was an occasional Wasserhelle cell.

The pineal body was normal in size and appearance. The sella turcica showed no erosion. The hypophysis weighed 0.6 gram and was normal in size and appearance. Histologically⁴ there was no appreciable invasion of the posterior lobe by basophils. It was essentially normal with reference to number and size of basophils. There was more than usual vacuolization of the basophilic cells.

The adrenals showed no adenoma.

Since Cushing's³ original communication, the clinical similarity of his syndrome and that found associated with suprarenal cortical tumors and that found accompanying neoplasms of the thymus has been repeatedly emphasized. Only in the more obvious cases could one say clinically which of these three organs was the anatomical center of the picture. All who have tried to explain which organ with its known hormones had anything to do with the production of such a remark-

CASE REPORTS

able constant clinical syndrome soon found themselves in a maze of contradictory evidence. In the present case no tumor of any kind in any organ has been established. This calls for a reconsideration of the whole mechanism. Where is the common denominator in this highly interesting syndrome? Crooke² thinks he has

them. Hyaline changes were absent in all the others. In the case reported today there is no evidence of any adenoma or neoplasm in any endocrine organ or any other type of tissue. Examination of the basophil cells by Crooke revealed the same hyaline change most profusely. Going back to the case reported by me before



Fig. 1. Close view of patient showing hirsuties of face.

found this common denominator. In a case with a tumor of the suprarenal cortex having symptoms attributed to a basophil adenoma of the pituitary and called pituitary basophilism, he found a change in the basophil cells which had not been described before. Search in twelve other cases of so-called pituitary basophilism, six of which had pituitary basophil adenoma, three with suprarenal cortical tumor or hyperplasia, and three with thymic neoplasms, all showed similar findings in the basophils of the pituitary. This change consists of the appearance of a hyaline-like substance in the cytoplasm brought out by special stains, which to him is an indication not of a degenerative process in the cell but an evidence of a changed function. Scrutiny of 350 other pituitaries from various types of cases not exhibiting basophilism revealed in contrast to the marked hyaline changes in the basophils of the basophilism cases only slight hyaline changes in nine cases: three cases of Bright's disease (with no cardiovascular hypertrophy), renal tuberculosis (1), disseminated tuberculosis (1), septicemia following abortion (1), bronchopneumonia complicating acute appendicitis (1), carcinoma of the stomach (1), carcinoma of the rectum (1). So few were the cells involved in this group that prolonged search was necessary to find

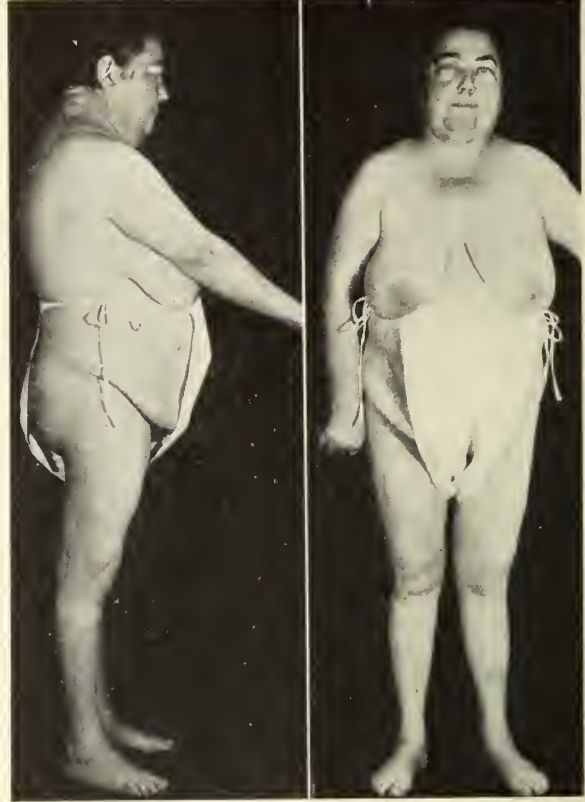


Fig. 2 (left). Side view showing purple striae of abdomen and proportion of body to arms and legs.

Fig. 3 (right). Anterior view showing adiposity of face and body.

the Pathological Society and also before the Minnesota State Medical Association in 1934,⁵ in which a large basophilic adenoma of the pituitary was demonstrated without changes in any other of the endocrine glands, this hyaline change was again demonstrated. In a case on the Pediatric Service which had all the physical and clinical data resembling basophilism but which had a malignant tumor of the suprarenal cortex with metastases to the liver, the hyaline change in the basophils of the pituitary was also present. This brings the number of cases with Crooke's hyaline change up to fifteen, of which we at the University of Minnesota have knowledge. Crooke was unable to demonstrate this change in four cases of basophilic adenoma without basophilism. While more work must be done, the supposition that this variation in the basophils is a common denominator instigating the clinical picture of basophilism seem justified. Crooke's finding has pushed the controversy as to which gland is the center of these

abnormal physiological processes to cytological changes in a specific type of cell, i.e., the basophils of the pituitary. In time it is quite possible that Cushing's term basophilism will be justified.

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SARCOMA OF THE OVARY

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SARCOMA of the ovary is a very unusual and rare condition constituting, according to Stacy,¹¹ 4 per cent, and, according to Kroemer,⁸ 5 per cent of ovarian neoplasms. Jaisohn,⁷ in reviewing the available bibliography on this subject in the Surgeon General's Library, found only twenty-four cases from 1888 to 1915, including those cases reported from Austria, Cuba, France, Great Britain, Germany, Russia, Sweden and the United States. According to Boyd,³ the age period is much earlier than that of carcinoma and is not uncommon in children. Stacy¹¹ states that sarcoma of the ovary in children occurs most frequently under the age of five years. Bland-Sutton² collected sixty cases of ovarian growths in children under fifteen years of age, of which 26.6 per cent were sarcomas. Wiel¹² in sixty cases of ovarian growths in children under ten years of age found 25 per cent sarcoma. Bates and Sincerbeaux¹ reported a case of sarcoma of the ovary in a child ten months of age, while Doran⁴ reported a case of bilateral ovarian sarcoma in a premature of seven months, which died very soon after birth. Hoyd⁶ and Schwarz¹⁰ each report a case of sarcoma of the ovary in patients of twenty-three months of age, both being bilateral.

Pathology.—Such tumors may be of the spindle cell type and of a firm consistency, or, more commonly, of the round cell type and soft. Other histological varieties include the myxosarcomas and chondrosarcomas. Metastases are abundant and ascites a frequent accompaniment. These masses grow rapidly, may be unilateral, but more commonly are bilateral, usually smooth and occasionally nodular. They are found in the lower abdomen on one side or the other and are freely movable.

Symptoms

The most common evidence of the presence of such a neoplasm, in a child, is the recognition of the tumor

mass, either plainly observed or accidentally discovered, as its presence is made manifest by pain, frequently acute and often the result of a twisted pedicle, or due to a distended abdomen or pressure interference with some abdominal organ. Such pressure symptoms may result in diarrhea, constipation, vomiting, urinary disturbances or in intestinal obstruction of an acute type. While sexual precocity may or may not be present, precocious menstruation, enlargement of the breasts, development of pubic and axillary hair, precocious development of the external genitalia and enlargement of the uterus should serve always to attract one's attention to the possibility of an ovarian growth. In this regard, it might be well to quote Novak, of Baltimore,¹¹ as to the definition of precocious menstruation, which is as follows: "If menstruation begins and recurs regularly in a girl of 9 years, in this climate, it must be looked upon as precocious."

Diagnosis

Diagnosis is seldom made before operation. However, the discovery of a mass, usually in the lower abdomen, single or bilateral, usually freely movable and accompanied by ascites, should give a clue. Rectal examination should never be omitted.

Treatment

Removal by surgical operation, in favorable cases, is the treatment of choice; radiation is indicated in the less favorable cases.

Prognosis

According to Wiel¹² and Stacy,¹¹ the prognosis is less favorable in the young than in the adult, in whom the spindle type of growth is more common. Hoon⁵ in reviewing the literature found that from 80 to 90 per cent of children operated upon for this condition died within 6 months to one year.

Case Report

On November 3, 1933, at 9:30 a. m., there entered on my hospital service a white female child, nine years of age, with the complaint of a generalized abdominal pain. Her present distress began at 6 o'clock that morning, at which time she was awakened from her sleep with a severe pain throughout the abdomen, later localizing in the lower right quadrant. Her mother related that the child lay in bed with her knees drawn up, with pain over the abdomen, and that nausea but no vomiting was present. There was no other symptom referable to the gastro-intestinal tract and none to the urinary tract. At the time she was admitted to the hospital, her pains had fairly well subsided and she was quite comfortable. Temperature was 99.6°, pulse 108, respiration 20.

The past history disclosed she had been vaccinated at the age of four years. Had tonsillitis with earache at the age of five and a few months following this attack her tonsils were removed. At the age of seven she had had otitis media, and at the age of eight had chickenpox. She never had any other illnesses. She also gave a history of having suffered previous generalized abdominal pains at various times, but nothing as severe as the present attack.

Physical examination revealed a well-developed, well-nourished, white girl, age nine, weighing about 70

pounds, lying very comfortably and at ease in bed. The head and scalp were negative. On inspection the eyes appeared normal and the pupils round, equal, reacting to light and accommodation. Ears were normal except for some slight amount of wax in the left auditory canal. Hearing appeared to be normal in both ears.



Fig. 1.

The nose and mouth were normal except for two carious teeth. The tonsils had been removed. The neck was negative. Breasts were normal in appearance and the chest normal in appearance. Lungs and heart sounds were normal. On inspection the abdomen was normal and only slightly generalized tenderness on deep palpation was present. There was no rigidity or spasticity of the abdominal muscles. No rebound tenderness was present. The psoas test was negative. A palpable mass about the size of an average orange could be made out in the lower right quadrant, this mass being movable and not tender. An x-ray examination of the chest revealed no pathology; x-ray of the abdomen disclosed gas in the stomach and bowel, most of which was in the large bowel. There was no evidence of gas in the region of the cecum or the ascending colon, due, perhaps, to soft tissue tumor displacing this portion of the bowel.

In view of the disappearance of pain and the subsidence of the acute attack, with the disappearance of tenderness, it was decided to continue further observation of the patient for twelve hours. At 10:15 a. m., re-examination revealed no tenderness whatsoever of the abdomen. The patient was entirely free of pain and the entire abdomen was soft so that a definite mass as previously outlined could now be easily palpated over the bladder region. At 1:30 p. m., re-examination again revealed a definite, firm, freely movable orange-size mass readily palpated in the lower right iliac region. Rectal examination revealed a mass in the right side of the pelvis with no tenderness.

Urine examination was entirely negative. A check on leukocytosis was 12,000, with 90 per cent p. m. n's.

At 7 p. m. the patient began to vomit and became listless. The abdomen was fairly soft and the same mass, now slightly tender, could again be palpated over the symphysis. It was then decided to operate.

Pre-operative diagnoses were: (1) appendicitis with omental adhesions; (2) intussusception of volvulus; (3) ovarian tumor.

Operation was performed that evening under general gas anesthesia. The abdomen was opened with a mid-

line lower abdominal incision. Clear ascitic fluid was present. There were omental adhesions attached to the parietal peritoneum in the region of the symphysis pubis. A dusky-colored appearing mass, the size of a large orange, was present in the right side of the pelvis. This fairly firm growth was found to be an ova-

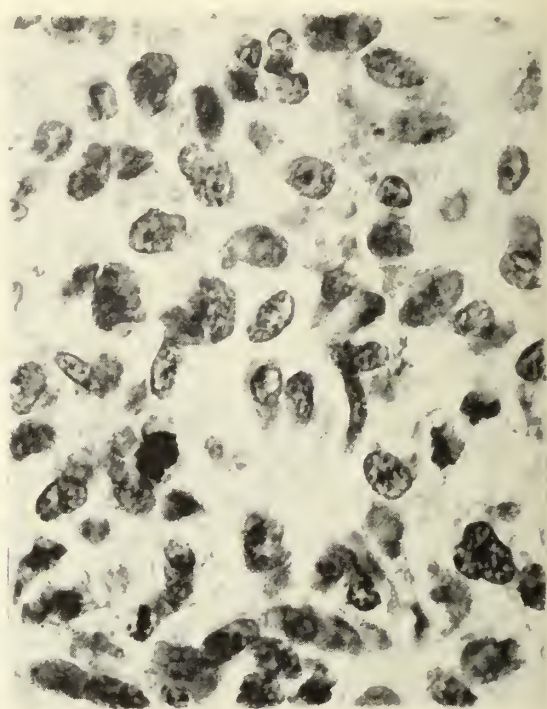


Fig. 2.

rian tumor with a twisted pedicle. This mass, including the tube and pedicle, was completely removed by clamping and ligating the pedicle. The left ovary was normal in size and appearance. The uterus was normal in size. There were no visible or palpable evidences of metastases. The omentum had firmly united itself to the very tip of the appendix. The appendix was also removed.

The patient made an uneventful recovery and is entirely well at this writing.

The *pathologist's report* is as follows:

"Gross appearance: The specimen consists of a smooth tumor mass, the size of a large orange, the surface of which has a bluish-grey color. The center of the tumor consists of a yellowish-grey solid tumor material and is covered by a thin membrane. The appendix is small, 4 cm. in length and 4 mm. in diameter.

"Microscopic description: The tumor is quite solid and cellular, being composed principally of fibroblasts, which produce, however, very few collagenous fibers. There is a moderate variation in size and shape of the cells, and mitotic figures are fairly frequently encountered. The tumor contains large numbers of vascular spaces within which occasionally may be seen free tumor cells. The appendix is without pathological changes.

"Diagnosis: Sarcoma of the ovary, moderate malignancy.

(Signed) Dr. Lufkin."

At this writing this patient is now twelve years of age, is well developed, weighs 118 pounds, and is 5 feet

(Continued on Page 554)

CLINICAL PATHOLOGIC SEMINAR*

Conducted by E. T. BELL, M.D.

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Chronic Glomerulonephritis

Case 17.—A man, aged twenty-four, was admitted to hospital January 27, at 2:10 a. m.; he had been entirely well until four weeks before admission when he developed a severe head cold. One week later he noted edema of the feet and ankles; some edema of the face and neck; no pain. Two days before admission, he developed a severe sore throat with a cough and a feeling of dryness in the throat. He had had three severe attacks of epistaxis in the past two days. He noticed some diminution in the amount of urine passed during the last few days. There was no pain at any time except that due to sore throat and cough. He had scarlet fever at the age of four; had mumps and measles; no disturbance of vision; no edema until the present illness. Father died of cardiac disease. Family history otherwise was unimportant.

Examination revealed a well developed, well nourished young white man, appearing acutely ill; very dyspneic; face slightly puffy; subconjunctival hemorrhages; pupils round, equal and reacted to light and accommodation; no apparent diminution of vision; nose normal; lips dry and fissured; tongue and posterior pharynx coated and a uremic odor was noted on the breath. There was marked inspiratory dyspnea but breath sounds were normal and resonance was normal throughout the chest. The apex beat of the heart was in the sixth interspace 1.5 cm. outside the nipple line; transverse measurement of the heart was 14 cm.; frequent ventricular extrasystoles. Systolic pressure was 164; diastolic varied from 0 to 40. Radial pulse was of fair quality; a loud first tone; systolic bruit at the apex.

Blood pressure in the receiving room was 188/90; it varied during the stay in hospital from this figure to 135/0. Liver edge was down 2 or 3 cm. but not tender. Extremities were covered with papulopustules and excoriations. Anus was surrounded by greenish, cheesy material. Prostate was thought to be enlarged. The patient was neurologic; reflexes were present but exaggerated; there was no Babinski reaction.

Because of the marked stridor an examination of the larynx was done and diagnosis was made of papilloma; tracheotomy gave the patient very little relief. Venesection of 400 c.c. of blood was done.

Urine in the receiving room showed albumin ++++; 4 to 8 red blood cells per high power field; no white cells; a few cellular casts. Urine, after postmortem, showed alkaline reaction; specific gravity, 1.018; trace of albumin; no erythrocytes seen; occasional leukocytes; one or two casts.

The first blood chemistry showed 185 mg. of urea nitrogen; the following day it was 296 mg.; creatinin was 8.3 mg. At postmortem, urea nitrogen was 304.5 mg.; creatinin, 12.5 mg. Hemoglobin, 20 per cent; red cells, 1,420,000; white cells, 12,250; 96 per cent polymorphonuclear leukocytes, 4 per cent lymphocytes. He died, January 28.

Postmortem findings: There was slight puffiness beneath the eyes; otherwise no edema. The skin showed the lesions described above. The recent tracheotomy wound was noted. The subcutaneous fat was 1 cm. in thickness over the anterior abdominal wall. There was no excess of fluid in the peritoneal cavity, the pleural cavities or the pericardial cavity. The heart weighed 400 grams and showed no abnormality except hypertrophy of the left ventricle; there was no disease of the coronary arteries. The lungs showed no edema; no

pneumonia. The liver weighed 1,635 grams; the parenchyma was slightly cloudy; there was no chronic passive congestion; the gallbladder and ducts were normal. The spleen weighed 200 grams and showed no disease. The pancreas and adrenals were normal.

The right kidney weighed 40 grams, the left 47 grams. There was marked hydronephrosis and hydro-ureter on both sides with extreme atrophy of the renal cortices; the ureters were not obstructed. The bladder showed no disease. There was no obstruction of the urethra. The larynx and trachea showed no changes except a mucous exudate, probably developing subsequent to the tracheotomy; there was no edema of the glottis.

Microscopic examination of the kidneys showed typical chronic glomerulonephritis; the atrophy was due to the destruction of the glomeruli and not to hydronephrosis.

Comment.—The hydronephrosis in this case is unexplained; it is not due to obstruction. The atrophy of the kidneys is not due to hydronephrosis but to the glomerular disease. The clinical picture is that of chronic glomerulonephritis; this is indicated by the hypertension and renal insufficiency. In advanced chronic glomerulonephritis with small kidneys, edema is often not conspicuous and may be absent. Evidently the disease had been present many years although the onset of symptoms was quite recent. There is no history of an acute attack, but the majority of cases of chronic glomerulonephritis give no history of typical acute nephritis.

Pyelonephritis

Case 18.—A man, aged sixty-nine, was admitted to hospital, February 15. He was first seen in the genitourinary outpatient department, on January 18, when he complained of frequency, urgency and foul urine. He had felt quite well until September of the previous year, at which time he noticed blood in the urine and began to have frequency. There was some pain in the region of the bladder; no other pains, no chills or fever. The symptoms gradually increased so that on admission, February 15, he passed urine ten times during the night and every ten to fifteen minutes during the day. The urine was dark red in color and foul.

Examination. He was undernourished. The chest appeared clear. Blood pressure, 132/80. The heart was enlarged to the left; apex beat visible just outside the nipple line; marked diastolic murmur best heard over the apex and in the third and fourth left interspaces. On February 18, cystoscopy showed a considerable mass of encrusted material on the mucosa of the bladder; the raw surfaces were much inflamed.

Blood on admission, 60 per cent hemoglobin; 3,580,000 red cells; 11,750 white cells. Blood chemistry, 1.8 mm. of creatinin; 24.5 mg. urea nitrogen. Urine: 1.010 to 1.017; constant heavy trace of albumin; few to many white blood cells; few to many red blood cells.

Intravenous pyelogram, March 6: faint appearance of dye on the five-minute film, in the right kidney; not seen until the fifteen-minute film in the left kidney, suggesting delayed function on the left side. Films up to the ninety-minute period showed renal pelves only

fairly well, suggesting rather slow function of both kidneys, evidently more marked on the left; marked dilation of the calices of the left kidney; moderate dilation on the right, indicating bilateral hydronephrosis; marked angulation of the upper portion of the right ureter and redundancy at the inlet of the pelvis; generalized dilation of this ureter. The left ureter was not satisfactorily visualized. There was marked arthritis of the lumbar spine.

The temperature, at first, ranged from 98° to 102.8°; then it leveled out save for occasional rises to 99° and 100°. On March 10, he developed a sudden, severe precordial pain. The pulse became feeble and the face cyanotic. He gradually grew worse and died at 12:40 a. m., March 11.

Postmortem report: The body was moderately emaciated; showed no edema or jaundice. There was no peritonitis. The heart weighed 400 grams and was practically normal except for some hypertrophy of the left ventricle. The lungs showed extensive diffuse bronchopneumonia. Both renal pelvis and ureters were moderately distended and contained purulent exudate. Numerous small abscesses were found throughout the kidneys. A rather marked cystitis was present. The prostate was enlarged and almost completely replaced by an abscess. No important changes were noted in other organs.

Diagnosis: Bilateral pyelonephritis with a prostatic abscess.

Comment.—The clinical studies established the presence of bilateral pyelonephritis. It is probable that the infection originated in the kidneys and extended downward to the bladder and prostate. Such descending infections result in moderate hydronephrosis because of obstruction of the ureters from inflammatory exudate. It is, however, possible that the initial trouble was an abscess of the prostate and that the infection in the kidneys was of ascending type.

Compression Myelitis of the Cord

Case 19.—A man, sixty years old, was admitted, February 6, with a history of increasing weakness and numbness of the legs and over the lower abdomen for the previous four months. He had quivering sensations in his legs at times. He was able to walk with difficulty; had no incontinence. For a month previous to admission he had had pain in the left flank when bending over. His past history gave no important data.

Examination revealed hyperesthesia at the level of the ninth thoracic which covered two segments; below this he had reduced tactile sensation, weakness of the muscles and increased knee jerks. While in the hospital he developed acute bronchitis and was allowed to go home, February 17, to recover.

He returned March 31; weakness of the legs and other symptoms had increased; it was now necessary for him to use crutches. Lipiodol was put into the cisterna and x-ray showed that the iodine had stopped at the level of the seventh and eighth thoracic spines. Operation was performed, March 23; a meningeal tumor, 1.5 cm. in diameter, was removed; this was attached at the inner surface of the dura. The operation was under general anesthesia and without incident. The temperature, after operation, rose to 100.8°; on March 24, it was 102.4°; by the 25th it was 107.6°. The patient was transfused with 500 c.c. of blood on the 25th. The blood pressure at noon, on the 25th, was 112/76 and dropped to 90/40 by evening. The patient died at 4:45 a. m., March 26.

Just before death, twitching of the face muscles developed. He could not swallow for twelve hours before death.

Postmortem examination: The gallbladder contained several calculi and its walls were thickened. Otherwise there were no lesions in the thoracic or abdominal viscera. There was no disease of the brain. The spinal cord, at the site of the operation, showed very slight gross changes but on microscopic examination there was a severe myelitis of degenerative type, involving both the gray and the white matter at the point where the tumor was pressing upon the cord.

Diagnosis: Compression myelitis of the cord.

Comment.—This is a benign meningioma but it had produced severe damage of the spinal cord before it was removed. The clinical record shows how the tumor was localized both by clinical examination and by the introduction of lipiodol.

Carcinoma of the Duodenum

Case 20.—A man, sixty-three years old, was admitted, February 13, complaining of weakness, loss of weight and jaundice. The onset of his illness was in January (a month before) when he developed diarrhea with eight bowel movements daily, accompanied by colicky pains in the abdomen. The diarrhea lasted ten days and then gradually disappeared. The abdominal pain and soreness also disappeared. The stools, however, became clay colored and jaundice appeared. His appetite became poor and he gradually lost weight and strength.

On admission, February 13, he was somewhat emaciated and severely jaundiced. The loss of weight was 63 pounds (from 165 pounds to 102 pounds). Chest and abdomen showed no abnormality upon physical examination. The liver was hard and a greatly distended gallbladder was palpable.

Blood: hemoglobin, 77 per cent; 7,300 leukocytes. Jaundice was severe; icterus index, 111 units. Urine contained a large amount of bilirubin; no urobilinogen. The feces were clay-colored. Quantitative urobilinogen on the feces was "negative to a faint trace."

Exploratory operation was performed February 26. The gall bladder contained 350 c.c. of green bile. It was anastomosed with the stomach. Following the operation there was no improvement. The patient gradually became weaker. The jaundice remained intense. Urine and feces remained the same as they were prior to the operation. The patient died, March 19.

Postmortem report: Rather marked emaciation; severe jaundice; cholecystogastrostomy was noted; this was firmly fixed but there was a purulent exudate around it; there was no general peritonitis. There was carcinoma arising in the descending portion of the duodenum which had spread extensively over this portion and had infiltrated the head of the pancreas. The common bile duct was completely occluded in its terminal portion by pressure of the tumor. The pancreatic duct, throughout the gland, was markedly distended as a result of occlusion of the duct of Wirsung. All of the viscera were deeply bile-stained. There were no metastases in distant organs but there was extensive infiltration into the head of the pancreas. The liver showed marked central atrophy of the cords, due to obstruction of the common duct. The obstruction of the common duct was complete as indicated by the absence of urobilinogen in the feces and urine. The clinical diagnosis of carcinoma of the pancreas was justified because in the large majority of instances a tumor developing in this region arises from the pancreas rather than the duodenum.

EDITORIAL

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BUSINESS MANAGER
J. R. BRUCE, Saint Paul

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Inter-State Post Graduate Assembly

AN opportunity will again be given Minnesota physicians to attend the meeting of the Inter-State Post Graduate Assembly when it convenes in Saint Paul the week of October 12, 1936. This annual meeting is essentially a short post-graduate course. Those who address the meeting are almost entirely professors in medical schools in this country and Canada. Generally, a few internationally known professors add their contributions to the meetings. In this issue of MINNESOTA MEDICINE appear in an advertisement the names of those who will participate in the program, and in our September number will be published the program of the meeting. A perusal of the names of those participating and the subjects to be presented should be convincing.

After all, the rank and file of the profession have little opportunity to take post-graduate

work. To abandon one's practice for a trip East or abroad requires considerable sacrifice of time and money. However desirable a trip abroad may be, the science of medicine in our own country is hard to excel. An incredible amount of information is crowded into a week's time at these Inter-State Assemblies. The variety of subjects enables one to pick and choose, although authoritative opinions on subjects outside a physician's particular field are broadening and educational.

Information regarding the Assembly is being disseminated and emphasized in advance so that our readers may make their plans to take advantage of this opportunity which will be at their very doorsteps.

State Meeting

PLANS for the Eighty-fourth Annual Meeting of the Minnesota State Medical Association are going forward rapidly.

The meeting is to be held in the St. Paul Auditorium in the Arena, Stem Hall, and the new Auditorium theater, and bids fair to be more important and extensive, so far as scientific program and exhibits are concerned, than any previous gathering.

Thirty-three technical exhibitors have already reserved space in the exhibit section and, in that connection, the following letter from a representative of one such exhibitor, Ayerst McKenna and Harrison (United States) Ltd. of New York, is an interesting testimonial of the esteem in which many technical exhibitors, hold the Minnesota meeting:

"We shall be pleased to have a plan of the Convention Hall (in St. Paul) as soon as it is available in order that we may select a site.

"Since, in your letter, you invite criticism of the Rochester meeting, here goes! In company with our local representative I attended the convention and must confess that I was agreeably surprised. Never before in my wide experience of such conventions have I attended one so successful from the point of view of interest on the part of doctors attending and in the numbers. Perhaps the venue had a lot to do with the success of the meeting but, apart from that, the interest displayed by so many doctors was a revelation to me . . ."

Danger of Intravenous Calcium

IN view of the popularity of intravenous calcium therapy a warning has been given of the grave danger that apparently lies in administration of calcium salts intravenously to patients who have previously received digitalis preparations.

Bower and Mengle* have recently reported two cases in which sudden death, apparently of cardiac origin, followed intravenous calcium given to patients who had been receiving digitalis medication.

This is not the first warning issued on the subject. In 1931 Liebermann reported the digitalis-like action of calcium on the heart and in 1933 published the results of experiments with scillaren (which has a digitalis-like action on the heart) and calcium. He pointed out the danger of using the two drugs together as their similar actions have what is termed an additive effect.

Bower and Mengle found that if 15 per cent of the lethal dose of calcium was given an animal there was slight change in the heart action. If digalen was first given and then the same dose of calcium, the animal's heart showed irregular action with fibrillation and asystole. If digalen was first given and then 30 to 40 per cent of the lethal dose of calcium, sudden death resulted. On the other hand, if 30 per cent of the lethal dose of calcium was given first and then large doses of digalen, no such untoward results followed.

The danger then lies in giving calcium intravenously after digitalis has been administered. Inasmuch as no warning has been given by any of the pharmaceutical houses of any contradictions to the use of calcium intravenously, the apparent danger in this method of medication should be called to the attention of the profession.

Medical Library Association

At the national convention of the Medical Library Association held in Saint Paul in June, the following officers were elected: Dr. W. W. Francis of Montreal, Canada, president; James F. Ballard, Boston, vice president; Janet Doe, New York City, secretary, and Mary Louis Marshall, New Orleans, treasurer. Richmond, Va., was chosen as the 1937 convention city.

*Bower, J. O., and Mengle, H. A. K.: Additive effect of calcium and digitalis. *Jour. Am. Med. Assn.*, 106:1151 (Apr. 4, 1936).

In Memoriam

Henry Theodore Nippert*
1868-1936

DR. Henry Theodore Nippert was born in Heilbronn, Württemberg, Germany, February 12, 1868, the son of the Reverend Dr. Louis Nippert and Adeleide (nee Lindemann) Nippert. Father was then an American citizen, who had been sent by his church to supervise and promote Methodism in Germany and Switzerland. This he did with success for thirty-six years, during which time he retained his American citizenship. He raised a large family. It was the distinction and the pride of his children to be born abroad as American citizens. Shortly after my birth, father was appointed to take charge as director, of the newly established seminary, in Frankfort-on-Main. Here I attended school and high school, graduating at the age of seventeen years. Then I entered the drug trade. In September, 1886, father made up his mind to return to the United States. He took charge of church work, first in Pittsburgh, Pa., and later in Cincinnati, Ohio, while I made straight for Minneapolis, Minnesota, where my older brother, Doctor Louis Nippert, had started to practice medicine a few years before. The first job I had was as a clerk in a drug store owned by Mr. August Grotendorf, Northeast Marshall Avenue, where I remained about one and one-half years. Then I left for Cincinnati, Ohio, and entered the Cincinnati College of Pharmacy, for which I graduated two years later with the degree of Ph.G. Shortly after graduation, I took up the study of medicine at the Miami Medical College, a department of the University of Cincinnati, from which I graduated in the year 1891. I then entered the Cincinnati General Hospital, first as externe and then as interne.

On August 2, 1893, I was married to Bertha Elizabeth Wendt, of Newport, Kentucky, and started the practice of medicine in Saint Paul. During the first year, I joined the Ramsey County Medical Society, later the State Medical Society and the American Medical Association; and was elected to the Minnesota Academy of Medicine. I had the honor and the privilege to serve the Ramsey County Medical Society as their president in the year 1916. I served on the Staff of the Ancker Hospital for about twenty-five years, resigning in favor of younger members of the profession, in 1919. While a member of the Medical Staff, I was instructor of medicine to the students of Hamline University Medical Department, and later the University of Minnesota.

I hope and express the wish that my professional brethren and comrades in arms will always be as con-

*Written by Dr. Nippert shortly before his death, which occurred July 4, 1936, at his summer home on Big Sand Lake, Minnesota. Dr. Nippert is survived by his widow; three daughters—Mrs. Vernon D. E. Smith and Mrs. John B. McGrath, Saint Paul, and Mrs. Arnulf Ueland, Minneapolis; a son—Carl L. Nippert, Saint Paul; two brothers—Dr. Edward Nippert, Los Angeles, and Judge Alfred K. Nippert, Cincinnati; and three sisters—Mrs. Louis Hemlinge, Seattle, and the Misses Eleanore and Mary Nippert, Cincinnati.

genial and considerate to and of each other, as it has been my privilege to find and be treated by them, during my years of association with them.

During my practice in this city of ours, which has grown dear to me, as well as our wonderful State of Minnesota, I have always endeavored, and if I have succeeded, I consider that I have reached the goal of my earthly efforts:

First: To do my duty and to take care of my family.

Second: To do the best I know of to care for my patients, and To do my duty to my country, state and our city.

Last, but not least: To stand heart and soul by my chosen profession, and my comrades; to help to develop a feeling of friendship, tolerance and regard for each other and to sustain each other in our hour of trial and trouble, which so frequently occurs in the practice of medicine.

So "Nip" calls to you: "God Bless you and be with you, until we meet again at the pond which we all have to cross and from which no traveler returns."

I heartily agree with William Allen White, who said: "As one grows into one's middle sixties, death seems more reasonable than it does in childhood and youth. The thought of death used to terrify me. Now it seems a natural thing, a part of life, just another experience, whatever it is. So many of my friends have faced it, why not I? I have been shaving this funny old face every day, including Sunday, for years and years. I have come to look on it as a mask, behind which lies the reality that it has to hide. It is getting a bit battered and shop worn. Perhaps it would not be such a bad idea to cast it off and let dust return to dust."

As our friend who never disappoints us in calling us sooner or later, Death may be near by, as expressed in the following:

*Zeigt sich der Tod einst mit Verlaub und ruft mich:
Bruder, komm'! Dann stelle ich mich am Anfang taub
und schaue mich nicht um. Doch sagt der liebe Nippy:
Komm', mache keine Umstände; dann lege ich mein
Stethoscope hin und sage der Welt, Adieu.*

HENRY THEODORE NIPPERT.

Monroe M. Ghent

1870-1936

MONROE M. Ghent, known as "Mun" by his family and intimate friends from early boyhood, was the eldest son of Washington and Fronia (Counsel) Ghent. He was born April 10, 1870, in Williams County, near Marion, Illinois, and his death occurred in his home at 10:30 P. M. May 10, 1936. As he had often wished, he died suddenly, from an attack of angina pectoris which came on earlier in the evening as he was driving home after a game of tennis.

Dr. Ghent attended grade and high school at Marion, Illinois, and later graduated from Valparaiso College, where he chummed with Dr. Thomas W. Stumm of Saint Paul, who passed away in 1914 from cardiac failure while studying in Vienna.

Dr. Ghent taught school in Williams County, Illinois, until he entered Rush Medical College at Chicago, from

which he graduated in 1901. He first located at Hibbing on the Iron Range but after a short time he left for three years of postgraduate work in Vienna and other European cities. Because Dr. Stumm was here he came to Saint Paul in 1906 and located on Dayton's Bluff, where he continued in active practice till the day of his death.

Dr. Ghent was a member of Ramsey County Medical Society, the Minnesota State Medical Association and the American Medical Association. He was a staff member at Mounds Park, Bethesda and St. Johns Hospitals in Saint Paul, where he was always keenly interested in the work of the Hospitals and the work of the other members of the staff. He was a most faithful attendant at all staff meetings and could be depended upon to make the discussions interesting and instructive, was quick to comment and criticize and never hesitated to bring out what he thought was right and true even though he himself was hurt by it. He was often sarcastic and sometimes quite intolerant of the opinions of others in discussion of cases. This attitude was probably to a certain degree assumed, as he often said that the best way to get anything worth while out of a discussion was to put the speakers on the defensive and get some of them mad, at him or at each other. He had supreme contempt for what he considered racketeering in medicine and a sincere reverence for those whom he considered great and honest in the medical profession.

He was a tireless student and for the past nine or ten years he rarely missed Dr. Bell's pathologic conferences at the University of Minnesota and he attended most of the Staff meetings of the University Hospital. He was a frequent visitor at the Mayo Clinic hospital and staff meetings and attended most of the meetings of the Interstate Medical Assembly and continually urged younger men to attend with him.

Dr. Ghent was probably one of the most generous of all Saint Paul's doctors in the help and inspiration he so willingly gave to younger men. He was never so happy as when he could be of assistance either with advice or actual help to younger surgeons in interesting or complicated cases and his interest did not depend on what he would ever get out of it.

In 1905 he married Rosa Welser. Mrs. Ghent died in 1917.

In 1920 he married Mrs. Bertha Owen Morris, who survives him. He is also survived by a brother, Walter C. Ghent of Carterville, Illinois.

Monroe Ghent was an outstanding character and will not soon be forgotten by his many friends. He was a great lover of sports—tennis, golf, and horseback riding in the summer and bowling and ping-pong for winter exercise. He loved his fellowmen and was devoted to what was right and fair. He had a happy and a practical philosophy of life, he loved a good story, he was kind and generous, and was loved by his patients. His genial companionship and loyal devotion to his friends endeared him to all.

EDWARD W. OSTERGREN
A. S. ARNQUIST
JOHN A. SWANSON.

E. Starr Judd*

WHEN I came to Rochester in the summer of 1906 I found Starr Judd working as Dr. C. H. Mayo's first assistant in the operating room and taking care of the patients who had been discharged from the hospital. As an extern for the first two months of my stay, I came in intimate contact with him in this daily work. When I was appointed an intern, I was assigned to the position of second assistant in Dr. Charlie's operating room and worked every day with Starr. We spent our evenings and Sundays together, often driving by team on Sunday to Oronoco, for there were but two or three automobiles in Rochester at that time. Later, it was my good fortune to take an annual hunting trip to northern Minnesota in the fall and live in camp for several weeks with him and with Henry Plummer.

When Starr was given an operating room I was his first assistant, a position I held until I left the Clinic in the fall of 1909. I mention all this to show how closely I was associated with him daily in his early work for a period of three and one-half years and I was honored to have been one of his earliest and best friends.

The traits which he showed in those early days and which deeply impressed me were his industry, his ability to solve problems for himself, his faithful performance of his duty, his kindness and his gentleness to his patients, his dexterity in the operating room, his conservatism in the treatment of unusual surgical problems, his great modesty and his quiet dignity, and, with all this, the companionship and the loyalty which he showed his early friends.

When I left the Clinic I followed his career with the keenest interest and I saw him rise to international fame and receive every honor which could be bestowed on an American surgeon, for he held membership in the best and most select surgical societies. He was elected president of the American Medical Association, one of the great medical honors to come to any man, and the best minds in medicine were counted as his friends. His many contributions to surgery were original and the result of thoughtful and conservative work. In all his writings he showed that same modest demeanor which characterized his life and his work. Naturally I saw much of him after I left, for I returned to Rochester as often as I was able and I met him frequently at the various medical meetings. What impressed me, as the years rolled by and his fame spread throughout the medical world, was that he had not changed a whit, for he was the same sweet modest loyal Starr that we knew and loved in the old days. How few men could have stood the burden of great fame and recognition as gracefully and as modestly as he.

Starr inspired a complete and an absolute confidence in his patients when he first met them, for he was a skilled psychologist as well as a great surgeon. Perhaps one of the best tributes to his surgical skill and

to his personality was the confidence he inspired among the surgeons of the land, for he was considered the surgeons' surgeon and they flocked to him when operations were needed to be performed upon themselves or upon their families. I speak with great feeling for he was my surgeon!

Starr Judd embodied all the characteristics of a truly great man. He was a master surgeon who contributed much to the advancement of modern medicine; he was a devoted husband and father whose home life was ideal; he had the modesty and sweetness that is so unusual to find retained after great success and world renown have come; he was a true friend and a lovable companion. His unfortunate and untimely death is a tragic loss to American medicine, to the Clinic, to this Society and to his countless patients and friends.

He will live on to serve as an inspiration and a sweet tender memory in the minds of all of us who knew him and who loved him to much.

 Louise Marie Gerber-Dietmeier

1868-1936

DR. Louise Marie Gerber-Dietmeier of Jasper, Minnesota, died after several years of impaired health from pneumonia July 2, 1936.

Louise Marie Gerber-Dietmeier was born in Monroe, Green County, Wisconsin, November 23, 1868, the daughter of John and Magdeline Gerber, natives of Switzerland. After graduating from high school at Kasson, she taught in the public schools. She then studied medicine and received her medical degree in 1893, following which she practiced in Ada for about seven years. In 1895-1896 she took postgraduate work at the Polyclinic in New York and while there supplemented her medical work with voice culture which enabled her to become a good speaker and vocalist.

In 1898 Dr. Gerber travelled in the Orient, visiting the leper colony in the Hawaiian Islands. Later she was to use the experience gained on this trip in diagnosing a case of leprosy at Jasper where she located in 1898. In 1910 she visited European clinics and upon her return built an artistic and modern hospital at Jasper.

On June 2, 1919, Dr. Gerber was married to Dr. Lewis Dietmeier in the Episcopal church at Freeport, Illinois. She is survived by her husband and five stepchildren—Dwight of Jasper, Roland of Helena, Montana, Elroy of Minneapolis, Lowell of Superior, Wisconsin, and Evangeline of Minneapolis. Three brothers, Anid Gerber of Spokane, Will Gerber of Pine Island, Sam Gerber of Argyle, and a sister, Mrs. C. S. Calkins, of Eugene, Oregon, also survive her.

Dr. Gerber-Dietmeier was unusually active in the practice of her profession until a few years ago. Five weeks before her death she was taken to the University Hospital suffering from a mental affliction and thence to the hospital at St. Peter, where death came.

*Tribute to E. Starr Judd presented by Donald Guthrie, M.D., Sayre, Pennsylvania, at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, June 4, 1936.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.
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Your Standing Orders

1. Keep in touch with your local county welfare boards so that proper arrangements can be made in your community for care of the sick poor: Also for the medical hospital and nursing care allowed in the law for recipients of old age pensions.

2. Make the acquaintance of your Senator and Representatives so as to keep them informed of the medical viewpoint toward all current problems involving medical care.

The above is a condensed version of the Standing Orders printed last month at the head of these columns.

They are so important to the future of medicine in Minnesota that they will bear reprinting. They should take first place on the program of every county society this year.

Under Fire Again

A writer of the so-called "liberal press" by the name of James Rorty has recently entered the lists against the policies of Organized Medicine in general and against the leadership of Dr. Morris Fishbein in particular.

The contentions and the sentiments expressed by Mr. Rorty are familiar. They have been voiced often before, but chiefly, in the publications of the "lunatic fringe" of healing—and in the publications of the rascally fringe with nostrums to sell.

This is, perhaps, the first determined onslaught in the radical intellectual weeklies. It was to be expected, of course, and it is particularly interesting because even here, in an editorial atmosphere where the dialectic is usually subtler, the Rorty attack is not subtle.

Issue Disregarded

It is characterized, instead, by a childlike acceptance of oft-recited and oft-refuted statistics; also by a childish disregard for the deeper issues at stake in the question of whether sickness insurance and paternalistic medical care shall be instituted in the United States.

It is hardly worthwhile here to refute the old figures again but there is one aspect of the statistical onslaught which should be kept in mind always by the physicians. It is this: that the reports of the Committee on Costs of Medical Care, which serve as powder and shot for all these attacks, are based upon a definition of illness that uses economic standards only, as a basis for computation. Amounts of medical care given or withheld are measured solely by charges made. Nowhere is there any effort to show how many sick persons sought care and were denied. Any evaluation of the amount of medical care available or lacking is worthless without consideration of this factor and of the great volume, also, of unrecorded service.

In any case, after all the statistics are cited and all the attacks upon the integrity of Doctor Fishbein have been brought to a resounding period, the real issue remains to be stated and answered.

The real issue in this question of medical care, as in all other relations of public and private life in America today, is: Are we Americans to follow Europe into a system of paternalism in which—in theory, at least—all the emergencies and uncertainties of a man's life are cared for by an autocratic power? Or are we to retain our essentially American philosophy of life and government in which the least possible government control is regarded as the best; in which the individual is free to solve his own problems and direct his own life?

Government Care Unsatisfactory

In the end, the American way is calculated to produce a people that has learned to solve its own problems. The ultimate end of the paternalistic system even under its most ideal conditions, is the production of a race of dependents, under-developed, incapable of intelligent control of its own destinies.

In addition, the doctors know from the experience of their European colleagues that medical care under fascism is most unsatisfactory. Politics, greed and inefficiency stand between the people and the efficient working of government medical care.

This is reason enough; but it is a question, in general, that goes deeper than Mr. Rorty has assumed.

Medicine Cannot Quibble

It is a vital part of the great issue that Americans have before them on all fronts. Medicine cannot quibble with it, nor espouse a false liberalism, simply to save itself from the onslaught of professional humanitarians.

As to specific charges of boycott, politics, demagogism made by Mr. Rorty in the two articles that appeared recently (*Forum*, July, 1936, "Medicine's Horse and Buggy" and *The Nation*, June 24, 1936, "The Case of John Kingsbury") they nicely exemplify the kind of political mud-slinging that medicine must look for now, from time to time, and there is small use in refuting them.

Thanks to Doctor Fishbein

America, says Mr. Rorty with a kind of horror, is almost the only civilized nation in the world that has failed to provide, by government organization or subsidy, for medical care for all the people. And he says that this failure is largely due to the American Medical Association and Dr. Fishbein. If that is true, then the fault must be laid at the doors, also, of the more than 90,000 physicians of the United States whom the American Medical Association represents. And why should the American Medical Association oppose medical care thus provided for all the people? Is it because the doctors of America like to stand back in their luxurious offices and hospitals and see helpless people suffer? Is it because these men would really enjoy withholding medical care from the people? Is

it because they are medical Capone's revelling in ill-gotten gains and protecting them by dirty politics against the possibility of a more humane system?

No normal child of ten could be made to believe such a thing.

Illness Not Checked

The answer, of course, is this: The doctors of America see that the theory of social medicine fails when it is put to the test. They see the progress of medicine hampered and halted; they see, too, that illness is not checked and death rates are not cut down.

On the other hand, they see America, the only civilized nation that has not embraced some form of social or insurance medicine, steadily conquering its disease enemies, cutting down its death rates, checking its morbidity in spite of this alleged backwardness.

Not Strong Enough

If, as Mr. Rorty earnestly urges, Dr. Fishbein and the political heads of the American Medical Association are exercising a stranglehold on American public opinion the physicians of America are certainly to be congratulated. What the other organizations—the American Legion, the Federation of Labor, for instance, would not give for such a stranglehold!

The truth is otherwise, of course. In spite of the fact that fully ninety per cent of them are in sympathy with the policies of the American Medical Association, American physicians, even with Doctor Fishbein as their spokesman, are not so powerful by one-half as they must be, if they are to be sure of protecting American medicine from the reforms that are so uncritically urged by Mr. Rorty.

California Swings to the Right

The following excerpts from an editorial recently published by *California and Western Medicine* are particularly interesting to medical observers in other parts of the country. They represent an important change of attitude on the part of one of the few units of organized medicine ever to dally with proposals for sickness insurance in the United States. Incidentally, they rob Mr. Rorty (mentioned above in these

columns) of the only real evidence he was able to marshal to his aid for the utterly unwarranted contention that officers of the American Medical Association do not represent the rank and file of doctors in the United States.

"Change of Front"

"If one outstanding feature of the attitude of the Coronado House of Delegates on matters of major policy deserves mentioning, it would be this: that evidently a somewhat radical change of front concerning health insurance is quite apparent in the California Medical Association as compared with points of view to which strenuous expression was given at Riverside in 1934, at the memorable special session in Los Angeles in 1935 and at the later regular session in the same year at Yosemite. . . . The delegated representatives of the profession, in meetings of the House of Delegates at Coronado, gave expression to their interest in methods of medical practice through resolutions submitted. But, basing judgment on the votes they gave, there can be little doubt on how a goodly majority of the delegates stood respecting matters of further experimentation with expensive, unsatisfactory surveys which thus far have led to little more than a startling dissipation of resources which the Association had slowly accumulated in previous years.

Undesirable Remedies

*"The conversations among delegates and attending members gave evidence, too, of the general thought now held by members of the profession that, while there has been a tremendous agitation on paper and in the minds of a small number of the laity and physicians concerning the amount and kind of medical and hospital care needed by a limited portion of citizens belonging to the lower income bracket groups, the propaganda so carried on by some of the proponents of certain health insurance plans had gone to extremes; and that the remedies were not adapted to achieving desirable ends for either the lay public or the medical profession.** The Coronado delegates gave no indication of desire to pursue, at the expense of the Association's members, further will o' the wisp or other surveys which, if really needed, might well be carried out through federal, state or local public agencies rather than at the expense of our physicians through their constituted organizations. . . .

Little to Show

"Now that so much has been spent and there is so little to show for it, the realization of what is construed as hasty and ill-advised action becomes more and more apparent. Unfortunately this change of mind does not bring back into the Association's treasury, the thousands of dollars expended upon the adventure."

(*Italics are ours.—THE EDITORS.)

President's Message

THE difficult problems involved in the maintenance of membership in our organization received much-needed attention in the action of the House of Delegates at Kansas City.

The vast majority of medical men are jealous of the high honor of their profession and feel personally affronted when their own high ethics are violated by men who have been accepted into membership in the units of organized medicine anywhere in the United States.

The difficulty and unpleasantness involved in disciplining such members locally has, too often, permitted undesirables to retain membership indefinitely.

At the suggestion of the Judicial Council a new machinery has now been set up under the American Medical Association by which such situation can be handled where the local society cannot or will not act. By an amendment to the by-laws of the Association, the Judicial Council "shall have power to request the President to appoint investigating juries to which it may refer complaints or evidence of unethical conduct which in its judgment are of greater than local concern. Such investigating juries, if probable cause for action shall be shown, shall report with formal charges to the President, who shall appoint a prosecutor who, in the name of and in behalf of the American Medical Association, shall prosecute charges against the accused before the Council. The Council shall have the power to acquit, admonish, suspend or expel the accused."

The strength and influence of organized medicine will depend, in the end, upon the quality of its membership. Unlike any other organization in American life, medical organization must show an individual membership that is above reproach.

It is to be hoped that this new amendment will be used forcefully and effectively to keep the fences tight and the standards high.

W. W. WILL, President,
Minnesota State Medical Association.

The Writing on the Wall

Needy old people in Minnesota have now been granted their pensions and their right to receive medical, hospital and nursing care from some established source has been specified in the law.

Does that, then, dispose of the problem of the needy aged?

It does not, in the opinion of Mr. Carl Hibbard, Fort Snelling, regional director for the Veterans' Administration, who spoke at a recent hospital meeting in St. Paul.

Mr. Hibbard professed to see, in the history of pension legislation and hospital benefits for veterans, an example of what may be expected to follow in due course upon the initial pension legislation for the aged.

First, he says, there is a modest bounty granted by the government. This bounty is not large enough to provide for extraordinary and occasional expenditures such as medical services.

At the same time, these services are not likely to be supplied freely, he believes, by all the responsible county authorities. Therefore, an organization composed of old age pension groups and, more important still, of sons and daughters of the pensioners, can be confidently expected to appear. The first objective is likely to be the establishment of special medical services and hospitalization without cost.

Liberalizing Pensions

The fact is, of course, that pension laws are nearly always liberalized and seldom successfully cut.

It is a fact, also, that a few county organizations have already made some difficulty about providing medical and hospital care for pensioners.

Will these difficulties prompt pension recipients and their families to demand special facilities for medical care for the needy aged?

Mr. Hibbard thinks so. He sees a parallel between pension legislation for the aged and pension legislation for the veterans and he believes that here, too, the writing is on the wall.

Obviously there is no need for government medical facilities for the care of the aged.

There is a need, however, for immediate negotiation on the part of medical representatives in each community with local county relief au-

thorities to see that aged pensioners are not denied the care that is allowed them in addition to their pensions in the law.

Co-ordinating Division

The first tangible result of the discussions and resolutions by relief workers, mayors and other functionaries who met in St. Paul last spring is the new Division of Coördinated Field Service just organized under the State Board of Control.

This division is headed by Mr. Benjamin E. Youngdahl, former Director of Social Service for the now discontinued SERA.

It will represent the Children's Bureau of the State Board of Control and all other social welfare agencies that are under the direct supervision of the Board.

It will also handle all field work pertaining to direct relief, old age pensions, and also give assistance to any other state or federal agencies that may apply; for example, the WPA, the Rural Resettlement Administration, the War Veterans' Relief Agency.

To Promote Efficiency

This assistance will consist, depending upon the needs of the individual agency, in helping to provide a qualified personnel; in checking as to the adequacy of the staff or the case work procedure; in investigations relating to the sufficiency of financial grants and in proper coördination of all services to avoid waste and duplication.

"Effort will be made," according to an official statement issued by the new division, "to unify and integrate various related welfare programs and activities in the counties with the dual purpose of promoting efficiency and furthering economy . . ."

Legislation has not yet been passed, of course, providing for any official consolidation of the work of all of these agencies. Many of the desired reforms and improvements can be put into effect without legislation, it is believed, through the good offices of this division.

Will Cooperate With Doctors

Incidentally, the new division has signified a desire to work closely with the medical profession in all respects. It is part of the organization's program to lend its influence toward the

establishment of medical care for the indigent and for recipients of old age assistance upon a basis of free choice of physician, with the physician paid for the work on a fee basis.

It is a happy augury for the future that, after an experience of several years with the conduct of relief generally, former SERA officials who are now acting in an advisory capacity to the new county system are all unanimous in favor of free choice of physicians for all patients and of the participation upon a fee basis of all doctors in the community for care of the sick poor.

This conviction is not the result of any pressure on the part of the medical profession but of years of actual experience backed by a careful study of costs under SERA.

Do You Care?

(A monthly editorial contributed by the
Medico-Legal Advisory Committee)

The practice of medicine in this year, 1936, has become a complicated one. Thirty years ago the medical man's life, especially in the urban community, was an individualistic one. He was beholden to himself alone. He, in his practice, lived an independent life in which he was numbered among the few educated members of the local social order. He was revered by young and old alike. To all he was "Our Doctor." Today this is changed. Individualism has given way to dependence on others in his work. Hospitals, assistants, nurses and associates, clinics and other more loose associations have complicated the picture. He now has become just "a doctor" of the community.

Each addition to his armamentarium has complicated his duty to society and the fellow members of his profession. Is it to be wondered at that many men are overwhelmed by the intricacy of practice and assume a "Don't Care" attitude toward the members of their own vocation? If Service Clubs and other business men's associations have their place in our lives, if they lead to a fuller interest in community life and an acquaintance with the problems of other professions and businesses, then your Medico-Legal Advisory Committee asks each member of our State society, likewise, to consecrate a little time each day to thoughts of medicine's welfare, to going to medical meetings, to assisting the officers of each county society in the furtherance

of their duties, to the bettering of programs and clinics, and especially to getting better acquainted with each other. Animositities will then be forgotten in the light of new-found interests in each others' problems. Conversation across the festive board will dispel prejudices, and a closer association will make for lasting friendship.

A Utopia, maybe, but an ideal to be sought for.

New Life

Medical societies are no longer the formal, cumbersome and slow-moving organisms that formerly slumbered peacefully and ineffectively between annual sessions.

Everywhere they are re-organizing their procedure, re-writing their constitutions, simplifying their committee structures. The objective is quick, effective, representative action. Committee membership is becoming a real task and a real responsibility; not simply a recognition of worth or a handy means of placating malcontents.

The reason is clear. Medicine is now called upon to play a real part in the social and economic readjustments of these times. It has a duty to perform outside the consulting room, and everywhere doctors are getting ready to perform that duty.

New York's Proceedings

The proceedings of the last annual meeting of the New York State Medical Association printed in the *New York State Journal of Medicine* for June 15, admirably illustrate this new atmosphere among medical societies.

Like the Minnesota State Medical Association, New York is revising its constitution and re-organizing its committee structure. The object is to coördinate the overlapping committee activities and bring all of them under one directing body.

Together with many other progressive state societies, New York's House of Delegates has a Speaker as presiding officer. The Minnesota House of Delegates adopted this highly desirable change of procedure at its 1936 session.

It is interesting to note, in the account of New York's proceedings, what a wide variety of interests were reflected in the resolutions introduced by members from the floor. They ranged

from strictly organization detail to licensure, compensation, medical inspection of school children, asphyxial deaths, group insurance, the eight hour day, child labor, state medicine and even world peace.

Many Reference Committees

It is interesting to note, also, that this huge volume of resolutions, recommendations and committee reports was referred, not to one, but to many Reference Committees for study and recommendation. This method of handling, undoubtedly, gives an opportunity for many delegates to participate actively in the conduct and decisions of the society.

The New York society is larger by many times than the Minnesota organization, but its problems are much the same and its manner of handling them not greatly different from the procedure in Minnesota. It is worthy of note that, with far less money to spend and with other obvious limitations, Minnesota has succeeded in setting up an organization—thanks to its alliance with the Minnesota Public Health Association—that is comparable to those of many larger and wealthier organizations.

The revision of Minnesota's constitution is proceeding, in general, along the same lines as the New York revision and is at the same point in procedure: that is, it has had a preliminary introduction to the House of Delegates preparatory to final changes and adoption next year.

Medicine—A Thorn in the Flesh of Spending

By JOHN T. LELAND, M.D.
Herman, Minnesota

Because Johnnie Q. Public wants to buy an auto on the put-off-until-tomorrow-what-you-should-do-today plan, because his radio, electric refrigerator and whatnot are likewise agreeably "segmentally" deferred, his obligation to the physician becomes a national problem. State medicine is to become the Spartan shield to protect this same Johnnie Q. Public from the inadvertent and inconsiderate intrusion of the uncouth doctor's fee which has the presumption to intrude upon an otherwise free and joyous dispensation of his pay check. Responsibility becomes the skeleton at the banquet of unrestricted spending, and medicine, the joy killer of chasing-

your-tail payments, is selected as the problem alibi.

Elevated from its humble origin as a plain old fashioned debt, it is blatantly heralded as a national responsibility. Would anyone dare to suggest that auto buying should be the state's affair? That the fee of the doctor who conducts into this vale of tears a future purchaser of automobiles should be so considered, seems to have occurred to no one as paradoxical. Fees for medical care become a burden debt of a sudden because they disrupt the smooth seductive flow of time payments toward the newest model of automobile.

Sickness, that morbid thing which the modern spirit of mad buying hopes to consign to the limbo of a managed medicine, is to become the barker's delight along the midway of politics.

As long as sickness is considered a calamity that chills the halleluja of the proverbial inebriate sailor's pocketbook, rather than about the only steady consideration that is capable of bringing the loose ends of family ties together in a realization of what we all really live for anyway, just so long may we expect the government or state to tune those ties into the strumming lutes for political patronage.

What justification is there in assuming that a doctor's bill, of all bills, is the unbearable burden? Is it, perchance, because it is not incurred every thirty days? Is it because credit is extended after sixty days in default of payment? Is it because the doctor advertises in so seductive a manner as to induce one to obligate himself when he should not? Is it because the service he has rendered demands a continuous upkeep? Is it because he gave the Jones's something you envy and must, too, obtain by hook or crook?

No. Then just why is the doctor's fee an imposition and a burden? It is because the doctor's fee threatens to keep the time payments from gumming up Johnnie Q. Public's rainy day deficit.

Taking Care of Injured Workers

Late reports from WPA headquarters show that an average of \$15,000 a month is being paid to Minnesota physicians for care of injured WPA workers.

This amount is being spread with a considerable degree of evenness between the 800 physi-

cians all over the state who indicated their willingness to do this work.

A list of these physicians in each community is in the hands of work foremen and regional supervisors. The injured workman is sent to the physician of his own choice if possible. If not, or if he has no choice, he is sent to the men on the list in rotation and having regard, of course, to distance and convenience.

This phase of the WPA program has been placed by law under the supervision of the United States Employees Compensation Commission and is subject to the commission's regulations. It is working very smoothly, for the most part, according to WPA officials, and with a minimum of dissatisfaction.

CCC Camps

It is interesting to physicians to note, also, that the new arrangements whereby medical care for all but the remote CCC camps is handled by local physicians is working out satisfactorily both to the doctors and to the WPA. In these cases first aid is administered by some layman at the camp especially trained for the purpose.

Minnesota State Board of Medical Examiners

To the Members of the Medical Profession:

Re Zanitone Company
Re Zanitone Liquid Herbs
Re Floyd R. Johnstone

The attention of the Minnesota State Board of Medical Examiners has been called to the activities of one Floyd R. Johnstone, a man about forty-five years of age, who is not authorized to practice healing in any manner in the State of Minnesota. Johnstone was at Warren, Minnesota, on June 20, 1936, at which time he was driving a Cadillac sedan, and was accompanied by a lady. He was distributing circulars and samples for "Zanitone Liquid Herbs." This preparation, which is advertised as a blood remedy and sells for the modest price of one bottle for \$1.00, three bottles for \$2.00 and hospital size bottle for \$5.00, is also advertised as a remedy for prostate trouble, rheumatism, constipation and menstruation irregularities. Johnstone had stated that he would be at Warren for four days, but left rather suddenly.

The Medical Board would like to question him concerning his activities and the distribution of this circular.

If this man, or any one representing Zanitone Liquid Herbs, Post Office 82, Oklahoma City, Oklahoma, should appear in your community, please telephone or wire collect, the State Board of Medical Examiners at 524 Lowry Medical Arts Building, St. Paul, Minnesota.

List of Physicians Licensed by the Minnesota State Board of Medical Examiners on May 4, 1936

(April Examination)

Allen, Pliny Arunah, Harvard U., M.D., 1934, Rochester, Minn.
Barr, James Adam, Stanford U., M.D., 1934, Rochester, Minn.
Bender, James Howard, U. of Minn., M.B., 1935, Two Harbors, Minn.
Bowers, John Gerald, U. of Minn., M.B., 1933; M.D., 1934, Eloise, Mich.
Burlingame, David Albert, U. of Minn., M.B., 1935, St. Paul, Minn.
Chessen, James, U. of Wis., M.D., 1935, Duluth, Minn.
Corson, Ada Catherine, U. of Minn., M.B., 1935, Minneapolis, Minn.
Concklin, Charles Lewis, U. of Minn., M.B., 1935, Minneapolis, Minn.
Deagen, James Richard, U. of Minn., M.B., 1935, St. Paul, Minn.
Earl, John Robert, Harvard U., M.D., 1933, St. Paul, Minn.
Eckhardt, Carl Lambert, U. of Minn., M.B., 1935, Minneapolis, Minn.
Ehmke, Edwin Charles, U. of Minn., M.B., 1935, Minneapolis, Minn.
Frey, Norbert Bernard, U. of Minn., M.B., 1935, Minneapolis, Minn.
Goldberg, Milton, U. of Minn., M.B., 1936, Minneapolis, Minn.
Grau, Robert Kenneth, U. of Iowa, M.D., 1933, St. Paul, Minn.
Groff, Jesse Emmert, U. of Cincinnati, M.D., 1934, Rochester, Minn.
Hartmann, Clarence Melchior, Creighton U., M.D., 1935, St. Paul, Minn.
Heidrich, Otto Fred, U. of Minn., M.B., 1935, Minneapolis, Minn.
Hill, Robert Jodoin, U. of Minn., M.B., 1935, St. Paul, Minn.
Hoffman, Walter Lees, U. of Minn., M.B., 1935, St. Paul, Minn.
Hutton, John Huntington, U. of Mich., M.D., 1927, Rochester, Minn.
Jewett, Robert Emmett, Indiana U., M.D., 1934, Rochester, Minn.
Johnson, Percy, U. of Minn., M.B., 1935, Indianapolis, Ind.
Johnson, Robert Emanuel, U. of Minn., M.B., 1935, Minneapolis, Minn.
Kelly, Hobart Martin, U. of Wis., M.D., 1932, Rochester, Minn.
Kendrick, Thomas Douglas, U. of Toronto, M.B., 1928; M.D., 1928, Rochester, Minn.
Kermott, Louis Henry, Rush Med. Col., M.D., 1935, Rochester, Minn.
Kraft, Haldon Charles, Indiana U., M.D., 1930, Rochester, Minn.
Laird, Donald Roth, Rush Med. Col., M.D., 1934, Rochester, Minn.
Lenz, Bernard Thomas, U. of Minn., M.B., 1935, Minneapolis, Minn.
Lysne, Myron, U. of Minn., M.B., 1935, St. Paul, Minn.
McDaniel, J. Zeb., U. of Georgia, M.D., 1932, Rochester, Minn.
Merricks, James Wesley, Jr., Rush Med. Coll., M.D., 1934, Rochester, Minn.
Middleton, Anthony Wayne, U. of Pa., M.D., 1934, Rochester, Minn.
Moody, Leonard Wood, Rush Med. Coll., M.D., 1935, St. Paul, Minn.
Mortensbak, Hjalmar Erwin, U. of Minn., M.B., 1935; M.D., 1936, Hanska, Minn.

Mount, William Maxwell, Indiana U., M.D., 1934, Rochester, Minn.
 Mouritsen, Glenn Jesse, U. of Minn., M.B., 1935, St. Paul, Minn.
 Mousel, Lloyd Harvey, U. of Neb., M.D., 1930, Rochester, Minn.
 Nevitt, Donald Marion, U. of Minn., M.B., 1935, St. Paul, Minn.
 Nilles, Leonard John, U. of Minn., M.B., 1935, Minneapolis, Minn.
 Nissen, Archie Sophus, U. of Minn., M.B., 1934; M.D., 1935, St. Peter, Minn.
 Noonan, William Joseph, U. of Chicago, M.D., 1935 (Div. Biological Sciences), St. Paul, Minn.
 Olsen, Arthur Martin, Rush Med. Coll., M.D., 1935, Rochester, Minn.
 Pasek, Antone William, U. of Minn., M.B., 1935, Cloquet, Minn.
 Proeschel, Ray Kenneth, U. of Minn., M.B., 1935, Duluth, Minn.
 Puumala, Reino Hendrick, U. of Ill., M.D., 1934, Chicago, Ill.
 Rudin, David N., U. of Minn., M.B., 1936; M.D., 1936, Minneapolis, Minn.
 Schleinitz, Fritz Bruno, U. of Minn., M.B., 1935, Minneapolis, Minn.
 Schmidt, Walter Robert, U. of Minn., M.B., 1934; M.D., 1935, St. Paul, Minn.
 Schweiger, Theodore Robert, U. of Minn., M.B., 1935, St. Paul, Minn.
 Seltz, Herman, U. of Minn., M.B., 1935, Minneapolis, Minn.
 Siegel, Clarence, U. of Minn., M.B., 1935, Eveleth, Minn.
 Silver, Henry, U. of Minn., M.B., 1935, Minneapolis, Minn.
 Simons, Stanley John, U. of Minn., M.B., 1935, St. Paul, Minn.
 Sinvkin, Melvin Bernard, U. of Minn., M.B., 1935, Minneapolis, Minn.
 Smith, Lucian Anderson, Rush Med. Coll., M.D., 1935, Rochester, Minn.
 Sprague, Randall George, Northwestern, M.D., 1935, Rochester, Minn.
 Swift, Edward Virginus, U. of Texas, M.D., 1933, Rochester, Minn.
 Underdahl, Laurentius Olaves, U. of Minn., M.B., 1935, St. Paul, Minn.
 Washburn, Richard Nathaniel, Rush Med. Coll., M.D., 1935, Rochester, Minn.
 Young, Henry Herman, Rush Med. Coll., M.D., 1935, Rochester, Minn.

By Reciprocity

Coventry, William Dean, U. of Mich., M.D., 1930, Duluth, Minn.
 Crawford, Helen Lucile, Rush Med. Coll., M.D., 1930, Winona, Minn.
 Doehring, Carl Frederic, Rush Med. Coll., M.D., 1928, Rochester, Minn.
 Trandem, Clarinda Elinor, Woman's Med. Coll., Pa., M.D., 1929, St. Paul, Minn.
 Wolfe, Albyn Garrett, U. of Ill., M.D., 1934, St. Paul, Minn.

By National Board

Wells, Arthur Herman, Harvard U., M.D., 1930, Duluth, Minn.

**List of Physicians Licensed by the Minnesota
 State Board of Medical Examiners
 on July 8, 1936**

(June Examination)

Anderson, Nina Augusta, U. of Minn., M.B., 1935, St. Paul, Minn.

Bloedel, Traugott J., U. of Minn., M.B., 1936, Minneapolis, Minn.
 Breck, Louis William, Northwestern, M.B., 1932; M.D., 1933, Rochester, Minn.
 Derifield, Randall S., U. of Minn., M.B., 1934; M.D., 1936, Minneapolis, Minn.
 Duncan, David Gale, Creighton U., M.D., 1936, Minneapolis, Minn.
 Guilfoile, Pierre Joseph, Marquette U., M.D., 1936, Minneapolis, Minn.
 Hayes, Albert Franklin, U. of Minn., M.B., 1936, St. Paul, Minn.
 Keller, Emil Theodore, U. of Minn., M.B., 1935, Sioux Falls, S. D.
 Klein, Joseph Clarence, Marquette, M.D., 1936, St. Paul, Minn.
 Kowallis, George Frank, U. of Pittsburgh, M.D., 1931, Rochester, Minn.
 Leick, Richard Mathias, U. of Minn., M.B., 1936, St. Paul, Minn.
 McCarten, Francis Michael, Creighton U., M.D., 1933, Stillwater, Minn.
 McDonough, Pierre Edward, U. of Wis., M.D., 1934, Rochester, Minn.
 McElmeel, Eugene Francis, U. of Minn., M.B. and M.D., 1936, St. Paul, Minn.
 McNearney, James Joseph, U. of Minn., M.B., 1936, Minneapolis, Minn.
 Mahle, Donald George, U. of Minn., M.B., 1935, South St. Paul, Minn.
 Mattison, Robert E., U. of Minn., M.B., 1935, Minneapolis, Minn.
 Nyvall, Pierre John, U. of Minn., M.B., 1934; M.D., 1935, Minneapolis, Minn.
 Odessky, Louis, U. of Minn., M.B. and M.D., 1936, St. Paul, Minn.
 Oltman, Jane Elizabeth, U. of Minn., M.B., 1934; M.D., 1935, Minneapolis, Minn.
 Quello, Robt. Oscar Beresford, U. of Minn., M.B., 1935, Fergus Falls, Minn.
 Rick, Paul Fred'k Wm., U. of Minn., M.B., 1936, St. Paul, Minn.
 Rieos, Frank Joseph, U. of Minn., M.B., 1936, San Francisco, Cal.
 Risch, Ronald Eugene, U. of Minn., M.B., 1935, Appleton, Minn.
 Risser, Alden Fairchild, U. of Minn., M.B., 1935, St. Paul, Minn.
 Sorenson, Kermit Ronald, U. of Minn., M.B., 1935, Glenwood, Minn.
 Spang, James Scollard, Marquette U., M.D., 1936, Grand Rapids, Minn.
 Swedberg, William Alfred, U. of Minn., M.B., 1933; M.D., 1934, Minneapolis, Minn.
 Van Valkenburg, John D., U. of Minn., M.B., 1935, Floodwood, Minn.
 Wall, William Lewis, U. of Minn., M.B., 1933; M.D., 1934, Anoka, Minn.

By Reciprocity

Beckering, Gerrit, Northwestern U., M.D., 1930, Edgerton, Minn.
 Glassberg, Irving Jeffery, U. of Minn., M.B., 1934; M.D., 1935, Minneapolis, Minn.
 Kortsch, F. Paul, U. of Colo., M.D., 1935, St. Paul, Minn.
 Lyght, Charles Everard, Queens U., M.D., C.M., 1926, Madison, Wis.
 McNaughton, Lawrence Marvin, U. of Ark., M.D., 1933, Bena, Minn.

National Board Credentials

Houston, Donald McClure, U. of Minn., M.B., 1934; M.D., 1935, Park Rapids, Minn.

OF GENERAL INTEREST

Dr. V. E. Quanstrom of the Beise Clinic, Brainerd, has moved to New Orleans, Louisiana.

* * *

Dr. Ward Akester of Marshall has moved into new office quarters in the Abbott insurance building.

* * *

Dr. M. J. McKenna, formerly of Graceville, has become associated with Drs. Jolin and Jolin of Grand Rapids, Minnesota.

* * *

Dr. W. W. Will of Bertha, who together with his family has been spending the past few weeks in California, has returned home.

* * *

Dr. L. R. Bouma of Saint Paul recently won honors in a skeet shoot by breaking forty-eight of fifty targets at the Riverview Rod and Gun Club.

* * *

Dr. T. C. Clark of Minneapolis was recently elected surgeon of the United Spanish War Veterans at their annual convention held in Saint Paul.

* * *

Dr. A. F. Risser of Saint Paul, who finished his internship at Miller Hospital recently, became associated August 1 with Dr. C. E. Fawcett at Stewartville, Minnesota.

* * *

Dr. and Mrs. A. M. Aanes of Red Wing celebrated their twenty-fifth wedding anniversary June 28. Their son, Russell, is serving his internship at the Minneapolis General Hospital.

* * *

Dr. D. Nolan, a graduate of the University of Minnesota medical school in June, has located at Amboy, Minnesota, where he will be associated in practice with his brother, Dr. L. E. Nolan.

* * *

Dr. Carl L. Eckhardt, who completed his internship at Asbury Hospital, Minneapolis, in June, has been appointed camp physician for Camp Lawrie, Boy Scout camp in the North Star scout area.

* * *

Dr. Gilbert Thomas of Minneapolis was elected president of the American Urological Association at its meeting in Boston in May. The Association will hold its next annual meeting in Minneapolis in 1937.

* * *

Dr. R. H. Puumala began the practice of medicine in Cloquet, Minnesota, July 15. Dr. Puumala is a graduate of the University of Illinois where he received his M.D. degree in 1933 and his M.S. degree in 1935.

* * *

Dr. Arthur D. Whiting of St. Cloud recently completed thirty-nine years of continuous practice in the same location. He has practiced his specialty of eye, ear, nose and throat work in St. Cloud since December 1, 1897.

Dr. J. C. Klein, who recently completed his internship at St. Joseph's Hospital, Saint Paul, will be associated in practice with Dr. F. H. Buck at Shakopee, where Dr. Buck completed twenty-five years of practice in June.

* * *

William N. Freeman, son of Dr. and Mrs. William L. Freeman of St. Cloud, entered Cook County Hospital, Chicago, July 1, where he will serve his internship until January 1, 1938. He is a graduate of Rush Medical College.

* * *

Dr. A. G. Chadbourn of Heron Lake has announced that Dr. L. H. Hammerstad, who has just completed his internship at Swedish Hospital, Minneapolis, will be associated with him in practice at Heron Lake beginning August 15.

* * *

Dr. W. McK. Craig of Rochester and Dr. James J. Morrow of Austin were elected to serve on the Board of Directors of the Minnesota Surgical Society at the annual meeting held in Duluth in July. They will each serve for a term of three years.

* * *

News has been received of the death of Mrs. L. F. Woodworth, wife of Dr. Woodworth of Le Center, which occurred in June. Mrs. Woodworth is survived by her husband, one son, Leonard, four brothers, all of Le Center, and two sisters.

* * *

Dr. John G. Lohmann of Fergus Falls and Miss Anastasia Hodgson of that city were united in marriage in June. Dr. and Mrs. Lohmann are making their home in Fergus Falls, where Dr. Lohmann is a member of the medical staff of the state hospital.

* * *

Dr. Frank Naegeli, who finished his course in medicine at the University of Minnesota this June, is recovering from a recent operation for appendicitis which delayed his going to New Jersey where he had planned on spending a year as intern in the Jersey City Hospital.

* * *

Dr. S. J. Simons, who recently completed his internship at Bethesda Hospital, Saint Paul, has established an office in Akeley, Minnesota, where he has entered the general practice of medicine and surgery. Dr. Simons is a graduate of the University of Minnesota.

* * *

Dr. Earl A. Loomis of Minneapolis has returned from a trip to California where he and Mrs. Loomis spent several weeks visiting his sons, Dr. George Loomis of San Francisco, and Donald Loomis of Hollywood. Mrs. Loomis will spend the remainder of the summer in the west.

* * *

The marriage of Dr. Bernard A. Flesche of Lake City and Miss Kathleen C. Dohan of Saint Paul was solemnized at St. Luke's church, Saint Paul, on July 16. Dr. and Mrs. Flesche are now at home in Lake

City, where Dr. Flesche has been practicing medicine and surgery since October 1934.

* * *

Funeral services for Walter Bacon, son of Dr. Harry Bacon of Minneapolis, staff physician for the U. S. Veterans' Administration, were held in San Gabriel, California, in June. Dr. Bacon's son died following an automobile accident near Walker Mine, California, where he was employed. He was a graduate of the School of Mines, University of Minnesota.

* * *

With the authorization of the Virginia hospital commission, a staff of thirteen local physicians and surgeons has been organized to act in an advisory capacity to the five members of the board, which will manage and operate the city's municipal hospital. Dr. C. B. Lenont was named president of the staff, with Dr. C. E. Goodman, vice president, and Dr. J. A. Malmstrom, secretary.

* * *

Dr. Anthony J. Spang and Dr. James A. Spang, brothers, will establish a general practice together in Duluth, where they opened offices last month. Dr. A. J. Spang for the past year has conducted a general practice in Buhl besides being medical director of the St. Louis County Hospital at Buhl. Dr. A. V. Fankboner of Mountain Iron will have charge of the county hospital at Buhl.

* * *

The marriage of Miss Margaret Hayes of Indianapolis, Indiana, and Dr. C. P. Johnson of Hendricks, Minnesota, took place June 29 in Indianapolis. Dr. Johnson is a graduate of the University of Minnesota medical school and Mrs. Johnson is a graduate of the Indiana University nurses' training school. They will live for a time in Minneapolis following their return from their wedding journey.

* * *

Dr. C. H. Buckley opened an office in Menomonie, Wisconsin, July 10. After graduating from the University of Minnesota medical school in 1932, Dr. Buckley interned at Grand Hospital, Chicago, then spent two years as surgeon in CCC camps in northern Minnesota and has been associated for several months with Dr. Kalinoff at Stillwater. Dr. Buckley has been a member of the Washington County Medical Society and his fellows wish him success in his new location.

* * *

Dr. and Mrs. D. Kalinoff of Stillwater, Minnesota, celebrated their twenty-fifth wedding anniversary at their home on June 7. Later they motored to Northampton, Massachusetts, where they attended commencement exercises at Smith College, from which their daughter, Naidena, was graduated this year. On the way home they stopped at Ann Arbor, Michigan, where they participated in the thirty-fifth anniversary functions of the Class of 1901, of which Dr. Kalinoff is a member.

Dr. H. A. Reimann, for the past six years Professor of Medicine and Chief of the Medical Service at the University Hospital, Minneapolis, has accepted the position as Magee Professor of the Practice of Medicine and Clinical Medicine at the Jefferson Medical College, Philadelphia, the position held by Dr. Thomas McCrae until his death last year. Dr. Reimann graduated from the Medical School of the University of Buffalo in 1921, spent three years at the Rockefeller Institute, a year with Professor Ghon at Prague and two years at the Rockefeller Institute in Peking, China, before coming to the University of Minnesota. His energies have been directed to clinical research and teaching and he has made notable contributions to the clinical phases of bacterial infections, including the pneumococcus group, Rocky Mountain spotted fever and staphylococcus pneumonia. Jefferson Medical College is to be congratulated on the acquisition of Dr. Reimann and the best wishes of the medical profession of the State of Minnesota will accompany him when he takes up his new duties about September 1.

American Board of Obstetrics and Gynecology

The next written examination and review of case histories of Group B applicants by the American Board of Obstetrics and Gynecology will be held in various cities in the United States and Canada on Saturday, November 7, 1936.

Application blanks and booklets of information may be obtained from Dr. Paul Titus, Secretary, 1015 Highland Bldg., Pittsburgh (6), Pennsylvania. Applications for this examination must be filed in the Secretary's Office 60 days prior to the scheduled date of examination.

SARCOMA OF THE OVARY

(Continued from Page 538)

$\frac{3}{4}$ inch tall. Up to the present time she has menstruated irregularly but is feeling very well and has no symptoms, no physical complaints, nor any clinical evidences of any illness.

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COMMUNICATION

BIOPSY

To the Editor: I have read the article by Kennedy in the *Medical Record* and gone over it very carefully. You ask for a statement from me as to what I consider objectionable in the editorial in the MINNESOTA MEDICINE for February, 1936.

First of all, I am perfectly willing to admit I am a little "touchy" regarding this question of biopsy because it seems to me to be a valuable procedure to one who is actively engaged in surgical pathology and general surgery, because, after all, anything which eliminates the guesswork in medicine certainly has value.

Referring specifically to the editorial in the MINNESOTA MEDICINE, you mention Kennedy's statement in which he admits doing a biopsy on a suspicious appearing cervical lesion and he immediately followed this by an operation when it proved to be malignant.

No one, as far as I know, is certain of the diagnosis of cancer from its gross appearance in its earliest stages and this is particularly true in the cervix, the Schilling test and every other sign outside of actual biopsy to the contrary notwithstanding. Isn't it better to take a piece of the tissue and find out as early as possible if it is cancer and then treat the patient accordingly with radium, x-ray, surgery, or any of the three in combination,

It seems to me that counselling doctors not to do a biopsy because of the risk of spreading the cancer is dangerous, because it encourages them to wait until the diagnosis of a malignant growth is obvious; on the other hand, without the benefit of biopsy information they will unnecessarily treat radically many benign lesions, for example, in the uterus or in the breast.

Every one knows who has followed curettage that it is impossible to remove all of the endometrium, but it seems reasonable to me that the risk of spreading a cancer from removal of a few pieces of tissue is much less than the risk of an unnecessary hysterectomy on a uterus containing hypertrophic polypoid endometrium. This condition may give all the clinical symptoms found in a cancer in the body of the uterus.

As far as I know, no work, experimental or clinical, has been done to determine the exact time required for a metastasis to take place, although, of course, it does happen whether it is a matter of seconds, minutes, hours, or days. Kennedy mentions, as many others have, that after a cancerous growth was biopsied it grew more rapidly. Now, the fact of the matter is, there is no real evidence from a clinical standpoint to support this because we do not know the exact rate of growth of any cancer in the human body. There is, however, considerable evidence in experimental pathology of cancer, showing that biopsy has no influence whatever on the rate of growth of the Flexner-Jobling rat carcinoma. I refer specifically to the work done by Dr. Francis Carter Wood entitled "Experimental Pathology of Cancer." (Journal of American Medical Association, 84:4-8, 1925.)

In this work Dr. Wood used the well-known Flexner-Jobling rat carcinoma, which grows at a very regular rate and kills the rat within three or four months after transplantation. Wood biopsied these growths and without any attempt at cauterization of the biopsy site found that cutting into them had absolutely no influence on the rate of growth or metastasis. Of course, this is an animal cancer and a transplanted one, but until we have more accurate clinical evidence of the

rate of growth and metastasis in the human family, it seems to me we had better heed the experimental evidence so clearly shown by Dr. Wood.

Dr. Bumpus, commenting on this same subject, said: "Biopsy has not to my knowledge resulted in the spreading of the growth or producing metastasis although such authorities as Thomas and Corbus warn against the practice. As parts of the neoplasm of the bladder break off from time to time as a result of the action of the musculature of the bladder, it is difficult to understand why the removal of a piece no larger than those frequently voided by the patient should result in spreading of the growth." (Journal of Urology, 21:371-380, 1929.)

Due to propaganda by the American Society for the Control of Cancer and by forward looking physicians, patients are constantly presenting themselves with suspicious lumps or lesions to their physician. After a careful history and physical examination the physician is not certain many times in these early lesions whether they are benign or malignant. The doctor must be able to tell the patient as accurately as possible, if he is fully to discharge his duty, that this is malignant or this is benign. As far as I can see, biopsy offers him the greatest certainty in making this most important diagnosis.

In doing a biopsy it is necessary "to get the right piece," as New has frequently said. If a biopsy specimen is negative, and the clinical history and clinical examination indicates malignancy should be present, more tissue must be removed because a negative biopsy examination is of no more value than any other negative laboratory test.

I hope, Dr. Drake, that I have made my position clear for I am interested as you and every other physician is who is forward looking, that the truth in medicine will come to the fore.

If there is any point in this letter which you would like to discuss further, I certainly would be pleased to hear from you.

Sincerely yours,
HAROLD D. CAYLOR, M.D.

EDITOR'S NOTE: The editorial referred to is one that appeared in the February number of MINNESOTA MEDICINE entitled "Biopsy Condemned" and was based on an article by Dr. J. W. Kennedy in the *Medical Record* of December 15, 1935.

The title "Biopsy Condemned" was unhappily chosen as the inference might be that all biopsy is to be condemned, an inference not at all intended nor advocated in the editorial. The statement that diagnostic curettage should be heartily condemned was Dr. Kennedy's idea and as used in the editorial appeared to be the editor's opinion. This is a pretty strong statement as there are doubtless indications for a diagnostic curettage. There are, however, competent gynecologists who do not rely entirely on curettage as an indication for hysterectomy. Repeated curettage in an effort to diagnose a malignancy of the corpus uteri might conceivably be to the detriment of the patient. That many curettages are not indicated is perhaps beside the point.

The main idea of Dr. Kennedy's article was that cutting into a cancer unnecessarily is undesirable. Most surgeons will agree. Otherwise why the wide excision of a cancer or the cautery knife? The purpose of the editorial was to emphasize this idea.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for August

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 9:45 o'clock every Tuesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

August 4—Low Blood Pressure.

August 11—When School Starts.

August 18—Iron and Anemia.

August 25—Jaw Tumors.

Biological Photographic Association

The Biological Photographic Association extends a cordial invitation to all photographers and scientists interested, to visit its Sixth Annual Convention in Boston, September 24-26, 1936, at the Hotel Lenox.

Active membership is open to those whose duties include biological photography. Any one who is interested in such photography may become an associate member. The annual dues, including Journal subscription, are \$3.00.

Applications should be addressed to the Secretary, Miss Anne Shiras, Magee Hospital, University of Pittsburgh, Pittsburgh, Pa.

International Assembly

The International Assembly of the Inter-State Postgraduate Medical Association of North America, under the presidency of Dr. David Riesman of Philadelphia, Pennsylvania, will be held in the public auditorium of St. Paul, Minnesota, October 12, 13, 14, 15, and 16, with pre-assembly clinics on Saturday, October 10, and post-assembly clinics, Saturday, October 17, in the hospitals of Saint Paul.

The aim of the program committee, with Dr. George Crile as chairman, is to provide for the medical profession of North America an intensive postgraduate course covering the various branches of medical science. The program has been carefully arranged to meet the demands of the general practitioner, as well as the specialist. Extreme care has been given in the selection of the contributors and the subjects of their contributions.

In coöperation with the Minnesota State Medical Association, the Ramsey County Medical Society will be host to the Assembly and has arranged an excellent list of committees who will function throughout the Assembly.

A most hearty invitation is extended to all members of the profession who are in good standing in their

State or Provincial Societies to be present and enjoy the hospitality of the medical profession of Saint Paul. A registration fee of \$5.00 will admit each member of the medical profession in good standing to all the scientific and clinical sessions.

A list of the distinguished teachers and clinicians who will take part on the program may be found on page xxii.

Special railroad rates will be in effect.

For further information, write Dr. W. B. Peck, Managing-Director, Freeport, Illinois.

Northern Minnesota Medical Association

The annual meeting of the Northern Minnesota Medical Association will be held at Fergus Falls, August 31 and September 1, 1936. The banquet will be held at the State Hospital on invitation of Dr. W. L. Patterson, superintendent, and his staff. Dr. O. J. Hagen of Moorhead will act as toastmaster, the dinner to be followed by the president's address by Dr. Arthur N. Collins and an address entitled "Vanishing Hosts" by the guest speaker, Dr. W. L. Strunch of Decorah, Iowa.

The present officers are: Dr. A. N. Collins, president; Dr. O. O. Larson, Detroit Lakes, secretary. Dr. F. J. Hirschboeck, Duluth, chairman of the Program Committee, has arranged the following interesting program:

1. The Medical School and the Practicing Physician.
H. S. DIEHL, M.D., Univ. of Minn.
2. Acute Abdominal Symptoms Complicating Diagnosis, with Case Reports.
J. L. McLEOD, M.D., Grand Rapids
3. Pilonidal Sinus and Its Treatment.
W. G. STROBEL, M.D., Duluth
4. Dyspnea and Dysphagia of Unusual Origin.
D. J. SCHWARTZ, M.D., Minneapolis
5. The Significance of Anatomical Features of the Vermiform Appendix in the Genesis of Acute Appendicitis.
O. H. WANGENSTEEN, M.D., Univ. of Minn.
6. Recent Developments in Anesthesia.
E. B. TUOHY, M.D., Rochester
7. Hemorrhoidectomy: A Plastic Operation.
NEWTON D. SMITH, M.D., Rochester
8. Eyeground Examinations as an Aid to Prognosis in General Medicine.
M. F. FELLOWS, M.D., Duluth
9. Chronic Hyperthyroidism.
C. I. KRANTZ, M.D., T. O. YOUNG, M.D., Duluth
10. Recent Advances in Diabetes Mellitus.
N. STAFNE, M.D., Moorhead
11. Some Fevers Difficult of Diagnosis, with Case Reports.
MOSES BARRON, M.D., Minneapolis
12. Silicosis on the Iron Ranges.
C. RAADQUIST, M.D., Hibbing
13. Symptomatology of the Various Leukemic States.
T. A. PEPPARD, M.D., Minneapolis
14. Interpretation of Heart Murmurs.
M. A. SHILLINGTON, M.D., St. Paul
15. Missed Abortion.
W. F. MERCIL, M.D., Crookston
16. Clinic—Neuro Psychiatry.
DR. W. L. PATTERSON AND STAFF,
Fergus Falls State Hospital for the Insane

Wabasha County

The sixty-eighth annual meeting of the Wabasha County Medical Society was entertained at Wabasha, Thursday, July 9, by Drs. J. A. Slocumb and H. T. Herman of Plainview and E. W. Ellis of Elgin.

There were twenty-three in attendance, including ladies, members and guests. At the business session the late afternoon, an amendment was offered changing the date of annual meetings to the first Thursday after the first Monday in October. A revised and amended fee-schedule was adopted. The following officers were elected for the coming year: President, Dr. A. Flesche, Lake City; vice president, Dr. J. S. Collins, Wabasha; secretary-treasurer, Dr. W. F. Wilson, Lake City. Dr. E. C. Bayley, Lake City, was elected delegate to the State Association; Dr. B. J. Duquet, Wabasha, Alternate. Censor for three years, Dr. J. A. Slocumb, Plainview. Upon invitation, it was voted to hold the next annual meeting at Wabasha.

Following dinner served at the Hotel Anderson, the following scientific program was presented:

President's Address—"Branchial Cyst with Case Report"

Dr. C. G. OCHSNER, Wabasha.
"The Differential Diagnosis Between Functional and Organic Nervous Diseases"

Dr. E. M. HAMMES, St. Paul.
"Infectious Fibrositis"

Dr. C. H. SLOCUMB, Mayo Clinic, Rochester.
"Mutual Relationships of Physicians"

Dr. B. J. BRANTON, Willmar, Representing a committee of the State Medical Association.

Dr. H. Z. Giffin, councilor for the First District, being present and called upon, made a few remarks concerning medical welfare and solidarity.

Special entertainment was provided for the ladies in attendance during the evening. Before adjournment, a rising vote of thanks was tendered the guest speakers, and all those who had a part in the entertainment at this occasion.

W. F. WILSON, M.D., *Secretary*.

* * *

Wabasha County Medical History

Few county societies go back as far as the Wabasha County Medical Society. On July 9, 1936, this society held its sixty-eighth annual meeting, the society having had its origin on June 25, 1869, when an informal meeting of doctors was held in Lake City, Dr. F. H. Milligan of Lake City acting as chairman and Dr. E. C. Spaulding, also of Lake City, acting as secretary.

A constitution and by-laws were adopted at the next meeting, November 25, 1869, and a seal consisting of a medical caduceus inscribed "Wabasha County Medical Society, organized 1869," is still in the possession of Dr. W. F. Wilson of Lake City, who has acted continuously as secretary of the society since 1896, except for one year when he was president.

The next meeting was held at Lake City on December 1 of the same year. A paper by Dr. Milligan entitled, "Why Should Doctors Disagree," was presented as a feature of this meeting. Among the seven or eight physicians present was Dr. G. R. Patton of Cincinnati,

Ohio, who soon afterward established his residence in Lake City. Also present at the meeting, according to the minutes, was L. H. Garrard of Frontenac, who was elected an honorary member of the society.

Charter members of the group include: Dr. F. H. Milligan, Wabasha; Dr. R. N. Murray, Lake City; Dr. H. W. Spafford; Dr. R. C. Remondino; Dr. Isaac J. Wells; Dr. E. C. Spaulding, Lake City; Dr. E. J. Baker, Durand, Wis.; Dr. J. P. Waste, Plainview; Dr. N. B. Axtell, Pepin, Wis.; Dr. G. R. Patton; Dr. J. C. Adams; Dr. B. F. LaRue, Lake City, and Dr. Teft of Plainview, who joined the group soon after the original meeting.

In those early days, membership in the group was not limited to the profession of Wabasha County, but included physicians in territory adjacent in Wisconsin and Minnesota. Physicians prominent in the state, such as the Doctors Mayo, Dr. Staples of Winona, Dr. Hewitt of Red Wing, Dr. McDavitt of Saint Paul, and some others, were elected honorary members and frequently attended meetings.

In 1903, the Wabasha County Medical Society affiliated and became a component part of the Minnesota State Medical Association.

On March 10, 1906, a banquet sponsored by the society was held in honor of Dr. J. C. Adams of Lake City on the occasion of his seventy-fifth birthday. He was presented with a gold-headed cane by his medical friends as a testimonial of the fact that he had practiced successfully in this locality for many years and was a typical example of the able practitioner and beloved family physician of the old school.

At the meeting held in 1910, the first steps were taken by the society towards securing a tuberculosis sanitarium for this county, which culminated in the establishing of Buena Vista Sanatorium at Wabasha. Dr. E. H. Bayley of Lake City was chairman of the first commission and held that position until his death.

The society did its part during the World War in the matter of national defence and active participation. Several special meetings were held in regard to this matter and as a result five members enlisted in military service, and all other members enrolled in the Volunteer Medical Service Corps.

Throughout its history the society has been active in all matters pertaining to the promotion of Public Health and Public Health Education. Several years ago a campaign was instituted to get all newspapers published in the county to carry articles on these subjects contributed by local physicians and officers of the State Medical Association. There was a wide response to this campaign and at one of the annual meetings of the officers of the State Medical Association this county was especially complimented for its coöperation in this regard. Not long ago, such matters as encouraging pasteurization of milk, sewage and garbage disposal, and other sanitary measures were brought about largely through the influence of the society.

Dr. Wilson has, in his possession, the fee schedule of the Wabasha County Medical Society adopted November 25, 1869. It is interesting to note that the fees for the commoner services such as calls, country trips,

office consultations, and minor procedures were essentially the same as at the present time. Prices are given for operations and treatments now obsolete, while, of course, many of the modern day operations were not known at that time.

It is interesting to note that the present objects of the society are much the same as those expressed in the preamble to the constitution adopted in 1869:

"This association stands for the following principles:

1. Extend medical knowledge.
2. Advance medical science.
3. Maintain a high standard of medical education.
4. Promote public health.
5. Make the profession more capable and honorable within itself and more useful to the public in the prevention and cure of diseases and in prolonging and adding comfort to life."

Washington County

The Washington County Medical Society met May 12, 1936. No scientific papers were presented, the meeting being devoted to a general discussion of economic problems. Dr. George Earl, Councilor for the Fifth District, was a guest at the meeting and took part in the discussion.

E. S. BOLEYN, *Secretary.*

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

ANNUAL REPORT, THE ROCKEFELLER FOUNDATION, 1935. 479 pages, paper cover. Illus. New York: The Rockefeller Foundation, 1936.

WILLIAMS OBSTETRICS. Seventh Edition. Henricus J. Stander, M.D., F.A.C.S. Professor of Obstetrics and Gynecology, Cornell University Medical College, etc. 1,269 pages. Illus. Price, \$10.00, cloth binding. New York: D. Appleton-Century Co., 1936.

THEORY AND PRACTICE OF PSYCHIATRY. William S. Sadler, M.D., Chief Psychiatrist and Director, Chicago Institute of Research and Diagnosis, Consulting Psychiatrist to Columbus Hospital, etc. 1,231 pages. Price, cloth, \$10.00. St. Louis: C. V. Mosby Co., 1936.

HEART DISEASE AND TUBERCULOSIS. S. Adolphus Knopf, M.D. (New York University and Paris). 108 pages. Illus. Price, cloth, \$1.25. Livingston, N. Y.: The Livingston Press, 1936.

FACTS ABOUT COMMERCIALLY CANNED FOODS. Issued by The American Can Company, 1936. 34 pages cloth covered.

WOMAN'S AUXILIARY

MRS. F. J. ELIAS, *President*, Duluth, Minn.
MRS. L. W. BARRY, *Editor, Press and Publicity*,
2193 Sargent Ave., St. Paul, Minn.

PRESIDENT'S ADDRESS*

MRS. E. M. HAMMES
Saint Paul

Mr. President, Ladies and Gentlemen:

I do not know which is greater, my sense of humor or my sense of fear at the idea of my being on a program with so many of the great in medical circles.

However, as a long-time member of the Medical Auxiliary, I am proud and glad to tell something of its achievements.

The Auxiliary occupies a unique position between the medical profession and the laity, and is increasing becoming a very useful channel through which to transmit health education, always, of course, under the direction of the doctors, so that we hope Auxiliary usefulness is educational, as well as philanthropic and social which latter is being so graciously exemplified by the local Auxiliary, during the Convention.

We have reason to be proud of the fact that, numerically, we come third in Minnesota, Pennsylvania and Texas being the only Auxiliaries having more members. But it is our ambition to have 100% membership, and seems odd to me that all doctors' wives would not want to join the Auxiliary and be glad to serve the husbands' profession. Why should we idly allow other women to direct health activities, when, as lay people mingling with other lay people, we have the advantage of Auxiliary information, obtained from the medical profession?

Sometimes, remote County Auxiliaries become discouraged and think they are not accomplishing much because, owing to long distances, bad roads, and so on, they cannot meet often or have much of a program. To them, I should like to say, that they do a lot, just by being organized and maintaining a spirit of good fellowship among the doctors' families, and that we need them just as much as they need us.

Each incoming president hopes, in her year, to help forward a little further that which needs so much help—public health education from the viewpoint of the medical profession, and, to that end, we ask the advice and direction of the doctors, and the help and cooperation of every doctor's wife in the State of Minnesota.

*Presented at the annual meeting of the Woman's Auxiliary of the Minnesota State Medical Association, Rochester, Minnesota, June 4, 1936.

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

Volume 19

SEPTEMBER, 1936

Number 9

FOREIGN BODIES AND THE USE OF X-RAY EXAMINATION IN THEIR LOCALIZATION AND REMOVAL*

WILLIS F. MANGES, M.D., Sc.D.

Philadelphia

IT IS an honor of the first order, and a privilege that is very highly appreciated, to be permitted to give this, the third Russell D. Carman Memorial Lecture, sponsored by the Minnesota Radiological Society and adopted by the Minnesota State Medical Association as part of the program of their annual meeting.

Doctor Carman was my contemporary and my friend. I was first attracted to him by his remarkable resemblance to a man who, more than any other, afforded me the opportunity to study medicine on my own resources. At the end of my internship, in June of 1904, this same man, Doctor Joseph Neff, the Medical Director, appointed me roentgenologist to the Jefferson Hospital to succeed Doctor Metheny, who wanted to discontinue the work.

It is small wonder then that the likeness in appearance of these two men should have drawn me to Doctor Carman. I received much from both of them—from Doctor Neff, opportunity and friendship; from Doctor Carman, friendship and inspiration.

Carman's most striking characteristic to me was his charming personality. He was strong mentally and physically, and at the same time more than ordinarily gentle. He accomplished a prodigious amount of work but never seemed to be in a hurry. He played less than most men, but was a delightful companion in moments of relaxation. He had a fine sense of humor, which was evident even when he seemed most serious. He was keen, unfaltering, and accurate. He had the courage to record his conclusions regardless

as to whether or not succeeding events would substantiate his findings. He was not boastful of his successes, but I dare say the surgeon had to be most thorough and exact in his operative work before venturing to say that Carman was wrong. His enthusiasm and interest in his work, as well as accomplishments, fitted him well for the enviable position he held in that great institution, the Mayo Clinic. He required large opportunity, and he had it there.

His contributions to the literature were of that clear, practical, and authoritative variety that has an enduring influence on the advancement of medicine. He accorded others generous credit, and throughout his writings—always in a modest way—he added much that was original and valuable.

Certainly, Carman has done more than any other American to bring fluoroscopy to the high plane of usefulness it occupies today. He accomplished this partly because he was more able than most men to handle the apparatus then available. He had an early and keen appreciation of the possible danger to himself, but was confident of his means of avoiding it. It is worthy of note that those who have followed in Carman's footsteps at the Mayo Clinic have recently shown in a truly scientific way that fluoroscopy as he practiced it is a safe procedure.

Probably the real explanation of Carman's success lies in the facts that he excelled as a roentgenologist, was an able clinician, a real student of medicine, and that he developed early an appreciation of the value of coöperation with those who practiced other parts of medicine and surgery.

*The Russell D. Carman Memorial Lecture for 1936, presented before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 4, 1936.

I would say of him as DaCosta said of Samuel D. Gross: "He was a loss to humanity. He died too soon, for he was in the full possession of his splendid powers, and was doing his best work."

As I said before, I received from Carman friendship and inspiration. I saw him doing fluoroscopic work and was greatly impressed not only with his skill, but also with the amount of diagnostic information he obtained. From that time to this I have profited by the inspiring effect of that first visit. I am sure that much of what I have accomplished has come through his influence.

If the roentgenological phase of this lecture has any merit, it is due largely to the information derived by means of the fluoroscope. I would like, if there were time, to recite to you in detail the many difficult problems in removal of opaque foreign bodies that have been successfully solved with the aid of the two-plane fluoroscope. The number of foreign bodies I have helped to remove in this way from the air and food passages runs high into the hundreds; a few have been taken from the brain; numerous others from various parts of the body; and in twenty instances I have successfully guided the forceps of Doctor Cross to nonmagnetic metallic foreign bodies in the eyeball, so that they were removed without loss of the eyeball except in one case when there was infection before the operation. In one case the foreign body was a shot no larger than a mustard seed. In another two pieces of brass were removed from the same eye.

I come now to speak of foreign bodies in the air passages.

Foreign Bodies in the Air Passages

This is a subject of universal importance because the human mouth is used as a receptacle for all sorts of things, not only food and liquids, but also an endless variety of articles that are neither food nor drink. The anatomy and physiology of the structures involved are alike in all human beings. I believe it is safe to say that during the first few years of life at least the inclination to put into the mouth anything that can be carried to it in the hand is a natural habit. The large majority of these accidents occur in young children.

When an object gets into the mouth, it will

do one of four things. It will be ejected, it will go down the esophagus, it will go into the lower air passages, or, occasionally, it will go upward into the upper air passages by way of the nasopharynx. Fortunately, most things go into the esophagus, and when they are proper things in proper amounts they go on into the stomach, providing that the esophagus is normal. We are concerned here with the objects that go into the lower air passages.

Most people have had the experience of having some small article of food or few drops of liquid go down the "wrong way," so that probably most of you realize how easy it is for such an accident to occur, and can also appreciate how prompt the structures in the air passages, especially those of the larynx, usually are to resent this abnormal invasion. I need only to assure you, then, that larger objects frequently take the same route, and may cause no more immediate result than the few drops of water or the very small particle of food, to make you realize the possibilities and the widespread opportunities for accidents of this sort that eventuate in the condition spoken of here as foreign bodies in the air passages.

What happens later depends upon the nature of the foreign body, its size, shape, and location. A definite, though very small, percentage are expelled during a coughing paroxysm; more rarely they escape during the relaxation of sleep; and also rarely, they may disintegrate and come away with secretions. Not infrequently they cause sudden death. In a very large percentage of instances the foreign body stays in the larynx, trachea, or bronchi until removed. If not removed the patient becomes an invalid sooner or later with the utmost certainty, and frequently has a very much shortened span of life.

One of the most thorough and interesting articles on this subject, from the clinical and surgical points of view, that I have been able to find is a monograph written by Samuel D. Gross, in 1854. He made a very thorough study of the medical literature of all countries and in all found record of only 200 cases. To these he added 50, most of which had come under his personal observation or treatment. His description of the usual history of onset, the symptoms, physical signs, and the resultant pathology, is not excelled by anyone in modern literature. Many

of the more recently discovered signs and symptoms are clearly stated in his writings. For instance, McCrae in his Lumlian lectures stated that the only physical sign common to all cases was limited expansion on the side of the foreign body. Gross speaks of the "Diminution if not entire absence of motion in the ribs." Jackson has emphasized the "period of calm" that frequently follows after the initial paroxysm of cough. Gross says, "The period of calm which ensues after the first paroxysms have passed away varies very much in its duration." He refers to the occasional asthmatic type of symptoms, and Jackson has emphasized the asthmatoïd wheeze. I thought at one time that I had discovered roentgenologically the state of obstructive emphysema that occurs so constantly in certain types of foreign bodies, but I soon learned that Dr. Iglaue had made the same discovery some years before, and I found still later that Gross had given a beautiful description of the same thing from physical signs and post-mortem findings in 1854. There is practically nothing new since the days of Gross except the use of the roentgen rays and the instruments of the bronchoscopist. The diagnosis has become a certainty, if the patient is given adequate study, and the high mortality of the older surgical methods has been completely eclipsed by the almost negligible mortality of the well-trained bronchoscopist and roentgenologist. The number of cases recorded by the bronchoscopists runs well up into the thousands. Their accomplishments constitute one of the most useful and interesting chapters of modern medicine.

It is my particular function to tell you of the part the roentgenologist plays, but it will probably not be inappropriate for me to dwell briefly before this audience on the clinical picture, as I have learned it from the literature and considerable observation, because after all the family physician is the one who first sees the patient and has the initial responsibility.

History.—The adult and the child old enough to realize and describe the foreign body aspiration accident almost invariably give such a clear history that it is sheer neglect on the part of the physician who gets that first news and does not promptly have a roentgen ray examination to confirm the diagnosis and localize the foreign body.

The problem is more difficult where infants and young children are concerned, except when the accident is observed by an older person, and then again it is clearly the duty of the physician first in attendance to have a careful and thorough roentgen ray examination. At times the parents are at fault for not consulting a physician.

Regardless of age, the accident is usually immediately associated with a severe coughing or strangling attack, which may be brief or long. If the foreign body is not expelled, the coughing paroxysms will recur sooner or later, but that "period of calm" is at times of such length that the history of the primary attack is overlooked by the doctor, as well as the parents, and the diagnosis of bronchitis, asthma, pneumonia, or tuberculosis is made. In one instance, a young child had repeated severe coughing attacks after his brother gave him a bite of apple. The doctor said: "If he did get a piece down his windpipe, it will dissolve." After the child had been treated for pneumonia for several weeks, he was sent to the Jefferson Hospital, where roentgen ray examination showed there were positive signs of foreign body, but no evidence of pneumonia. A piece of apple stem was removed bronchoscopically. That first severe coughing attack is then a most important event. When it is repeated at intervals, the diagnosis is almost positive on the history alone.

Symptoms.—The important symptoms are cough—recurrent and paroxysmal in character—restlessness, dyspnea, anxious expression, exhaustion. Fever is common and also varies in degree, as well as duration, abates and recurs, and when infection complicates, the variations often reach the extremes. McCrae says that slight continued or irregular fever is common. All of these vary in frequency and intensity in different patients and frequently in the same patient.

Physical Signs.—The important physical signs are rapid and often jerky respiration, limited expansion on the affected side of the chest, variation in the percussion note, abnormal breath sounds with every conceivable type of râles, often more noticeable on the unaffected side, and more than occasionally there is a wheeze somewhat like that heard in asthma. Change in the voice is apt to occur when the foreign body is in the larynx. Gross cites a case reported by

Burow, German surgeon, in which a boy twelve years of age aspirated into his larynx the larynx of a goose, after which the sounds made by the boy at expiration were not unlike the voice of the goose. Aphonia or various degrees of hoarseness are frequent. Displacement of the heart is frequently present, and is apt to shift from side to side with inspiration and expiration. If the foreign body is free to move in the trachea a flapping sort of sound may be heard. All of these signs vary in different cases, and, I would like to say with real emphasis, they vary so frequently in the individual patient that the change in the physical signs from day to day or hour to hour comes to be of real diagnostic importance. The variations are due to change in location of the foreign body, inflammation of the trachea and bronchi, the accumulation and expulsion of exudate, and variation in the degree of obstruction produced by the foreign body and the swelling of the lining membrane. I have on many occasions seen foreign bodies move from one location to another, or have seen the indirect roentgen ray signs vary in degree or location under fluoroscopic observation.

I may say without fear of contradiction that, in the early stages, a *negative* diagnosis of foreign body in the air passages cannot be made by means of the history, symptoms, and physical signs. Also, it is only fair to say that, unless the roentgenologist is thoroughly familiar with all of the obtainable roentgen ray signs, and the means of eliciting them, his percentage of failure in diagnosis will be relatively high, especially in the nonopaque type.

Pathology.—The changes that take place in the lung distal to the foreign body depend, as above stated, on the nature, size, shape, and location of the foreign body. Inflammation is always present and may involve the bronchi of the opposite lung, either by extension or shifting of the foreign body. It is always of general distribution when the intruder is in the trachea. Exudate may collect distal to the foreign body and have difficulty in getting out. This condition was called "drowned lung" by George Johnston. Interference with drainage invites infection and bronchial stricture, which inevitably progress until the obstruction to drainage is removed. The infectious process may be prompt in developing, very active, and give all the clinical signs

and symptoms of pneumonia or lung abscess. This is the usual happening with teeth, pieces of tonsil tissue, infected blood clots, etc. When drainage is established in one way or another, the patient is temporarily relieved, but if the foreign body remains, the infection is certain to recur. True lung abscess may ensue or the process will eventually develop into bronchiectasis.

Foreign bodies of long sojourn are worthy of special consideration. In the vast majority of instances, the pathological changes are on one side only, and distal to some definite point in the bronchial distribution, which represents either the location of the foreign body or the point at which it lodged to start the process. The foreign body may later go to a lower level when tissues are destroyed. Occasionally the entire lung of one side is involved, but mostly only the lower lobe. I have come to look upon a one-sided lower lobe chronic infection as of foreign body origin until proven to be of other source. An example of this kind was in the case of a young girl, without history of foreign body aspiration, who came to the Bronchoscopic Clinic because of a diagnosis of a chronic lower lobe infection. The roentgen ray examination revealed no foreign body shadow, but showed the sort of lesion so frequently seen in proven cases of foreign body that I ventured the opinion that there was a nonopaque foreign body present. The child improved under bronchoscopic drainage. On the eighth weekly treatment Doctor Clerf saw a little black speck through the bronchoscope and thereupon removed a tuft of grass in an excellent state of preservation.

In the early stages other changes may occur that depend upon the degree of obstruction produced by the foreign body and the physiologic expansion and contraction of the trachea and bronchi during inspiration and expiration respectively. When the foreign body lodges in a bronchus and causes a degree of obstruction that will not completely prevent air from entering the lung during inspiration—while the bronchus is expanded—but will interfere with equal escape of the air during expiration—when the bronchus is contracted—the lung distal to the foreign body remains more or less distended with air throughout the respiratory cycle. In short, a state of obstructive emphysema exists. Under

such conditions, a foreign body in the trachea will produce obstructive emphysema of both lungs.

Now, if the foreign body fits in a bronchus just a little bit more tightly and prevents air going in at inspiration, lung collapse follows, because the air distal to the obstruction is absorbed by the blood stream. Atelectasis will occur when the foreign body because of its size, shape and weight becomes tightly impacted in the bronchus; it will follow when bronchial membrane swelling around the foreign body is completely obstructive; or it will follow when the foreign body is capable of absorbing moisture, thereby increasing its size beyond the physiologic expansibility of the bronchus. The bean, as a foreign body, almost always does just this. Foreign body atelectasis is a very serious situation for the patient because with the pressure of the collapsed lung distal to it, and the pull effect of the other lung, the foreign body may suddenly be forced out of its position and get into the trachea, where it will cause extreme dyspnea, or it may go into the bronchus of the functioning lung, in which case sudden death ensues. One child died in this manner on its way to the hospital. Another such accident occurred in the hospital. This child would have died but for the fact that Doctor Tucker was in the ward at the time and performed an emergency tracheotomy, and fortunately found the bean above the level of the tracheotomy wound. After inserting the tracheotomy tube, he removed the bean through the larynx.

Types of foreign bodies include metallic, vegetable, and animal substances. Of the metallic group, tacks, screws, pins, safety pins, nails, staples, pieces of wire, ammunition, toys, pencil caps, collar buttons, dental and surgical instruments, tooth fillings, glass, coins, buttons, and pebbles, etc., are the more common. Of the vegetable, nuts, kernels, nut shells, beans, seeds, corn, cockle burs, prune pits, coffee beans, pieces of corn stalk, grass, apple stem, Job's tears, cork, cloth, rubber, etc., are those usually found. Of the animal, egg shell, bones, teeth, wax crayon, meat, fish, fragments of tonsil tissue, blood clots, etc., are the principal ones found.

In the roentgen ray examination of opaque foreign bodies it is best to make a thorough fluoroscopic study of the entire respiratory and

alimentary tracts, as a first step, because when the foreign body is visible on the screen, immediate information is obtained; variations from the normal in lung function are seen; the roentgenographic procedure can be directed to the best advantage; and occasionally there are multiple foreign bodies in various locations. The roentgenograms should be of such quality as to show clearly the shadows of the larynx, the trachea, the bifurcation and the bronchi throughout the chest, even behind the heart and dome of each diaphragm. This requires rapid exposures in infants and children too young to follow instructions with regard to breathing. In adults it may be necessary to use the Potter-Bucky diaphragm to bring out the shadow of the foreign body behind the heart, the dome of the diaphragm, or in an area of dense pathology. Stereoscopic films are of definite advantage in finding a semi-opaque foreign body such as a root of tooth or a piece of bone.

Exposures must always be made exactly through the median line anteroposteriorly and in the true lateral direction with the involved side near the film, to determine the relation of the foreign body to the bronchial tree. Exposures in other directions are to be made when it is necessary to bring out the true size, shape, and arrangement of the parts of the foreign body. It is important to know whether there are sharp projections, if the foreign body is irregular in shape; the spread of the safety pin or staple, and whether or not points are bent. These findings determine the bronchoscopist's plan of procedure and selection of instruments.

Occasionally there is doubt as to whether an opaque foreign body, such as a coin or other flat object, is in the trachea or esophagus. This is decided by having the patient swallow a bit of barium mixture and making direct lateral exposures.

Nonopaque foreign bodies are mostly of the vegetable group, such as nuts, seeds, stems, shells, beans, corn, etc. As a rule, they produce more bronchial inflammation than the opaque type. They almost never cast distinguishable shadows so that the roentgen diagnosis depends upon the presence of obstructive emphysema, atelectasis, exudate, or tissue changes distal to the site of the foreign body. Here, again, the first step should be a careful fluoroscopic study, because one sees

repeatedly the entire respiratory cycle and notes the presence of a degree of obstructive emphysema that might easily be missed if the peaks of inspiration and expiration were not recorded roentgenographically. The presence of atelectasis, exudate, or tissue change is, of course, readily recognized fluoroscopically. In the presence of obstructive emphysema, the fluoroscopic view is indeed an interesting one. When the foreign body is in a bronchus, the unaffected lung takes in and empties its air, while the affected lung remains more or less distended throughout the cycle. The heart and other mediastinal structures are usually in normal position at the end of full inspiration, but during expiration they move to the side of the emptying lung. Sometimes this to and fro movement of the heart is most striking. The diaphragm on the well side has more than the normal excursion, while the diaphragm on the obstructed side either has much diminished excursion or may even show paradoxical movement. If there is doubt as to the presence of obstructive emphysema in one lung, it is advisable to ask the patient to take full inspiration and exhale as much as possible, or to make the quiet infant cry to bring about the same result.

After the foreign body has been removed, a moderate degree of obstructive emphysema may persist for a time because of the inflammation in the bronchus. The possibility of more foreign body should be kept in mind and if the signs increase or continue more than a few days the diagnosis is again positive.

When the foreign body is in the trachea and interfering with adequate expiration, obstructive emphysema is present in both lungs. At the fluoroscope it is evident that there is more than the normal amount of residual air present at the end of expiration. The heart does not move to and fro, but it does rotate so that at the end of expiration the heart shadow is narrower than at full inspiration, because the intercostal muscles force the chest wall to contract in an effort to get the air out of the lungs, and this in turn causes the apex of the heart to rotate anteriorly. Under these conditions there is limitation of motion of the diaphragm, or possibly paradoxical movement, on both sides. These signs vary with the degree of expiratory obstruction. In extreme cases the lungs are greatly overdistended, dysp-

nea is of an urgent nature, and if the foreign body is not removed the patient will die from exhaustion when he is no longer able to keep awake and exert conscious effort to get the air out of his lungs. I have seen children fall asleep with the bronchoscope in the trachea after the foreign body has been removed.

Now, as stated previously, if the obstruction of a bronchus is complete to inspiration, atelectasis will follow in a relatively few hours. In this event, the fluoroscopic view shows the affected lung uniformly dense, and the heart displaced to the affected side throughout the respiratory cycle. There is some to and fro motion due to the filling and emptying of the functioning lung and the expansion and contraction of the chest wall. The diaphragm on the involved side remains high and fixed.

If the foreign body is removed promptly, the atelectatic lung will resume normal function quickly; but if the collapse has been present for some days then it takes nearly as many days to expand fully again.

If exudate forms distal to the foreign body, the collapsed lung may fill up and resume its original size or even be overdistended. In this case the heart is in normal position or displaced to the well side. The lung then has the appearance of a consolidation or because of the extreme density may look like an empyema.

The roentgenographic technic in the non-opaque group requires very careful consideration of the following points:

1. Every exposure must be accurately through the median line in the anteroposterior direction. Only slightly oblique exposures may interfere with estimating the lateral displacement of the heart.
2. The exposures must be made in $1/20$ of a second or less in those patients who can not or will not hold the breath as you wish.
3. Exposures must be made at as near full inspiration and complete expiration as possible. This requires some practice, but anyone can easily develop the knack of doing it. An exposure at the end of a prolonged crying sound will usually give a good view of expiration. The view at the end of expiration is the most important. It is sometimes necessary to make quite

a few exposures in order to get two that represent to a definite extent the two phases of respiration.

4. All exposures in a given case must be made with the same distance between tube and film, for then only can one compare the measurements of the chest, the size of the heart, and the position of the diaphragm. The chest has a

narrower transverse diameter at the end of expiration than at inspiration. This may be the only evidence to distinguish between inspiration and expiration when very little air leaves the lungs at expiration.

A negative roentgen ray diagnosis should not be made on a single examination in the presence of a positive history and recurrent symptoms.

THE SURGICAL ASPECTS OF PEPTIC ULCER*

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PERHAPS no field of diagnosis has progressed with greater rapidity or attained a greater degree of accuracy than that of gastro-intestinal disease. The patient now can feel secure in the opinion given as to whether he has or has not an organic lesion in any part of his digestive tract, but the treatment of these lesions is still a moot question—not as uncertain, however, as in the earlier days of gastro-intestinal surgery as practiced in this country. Several years ago there was no common ground upon which the surgeon and the internist could meet and discussions upon the question as to whether or not peptic ulcer should be considered a purely surgical or a medical question were always tinged with acrimony and, at times, with bitterness.

It is safe to say that a better understanding and a closer coöperation have come about since surgeons have become less radical and have realized that a certain percentage of peptic ulcer cases can be permanently cured by a strict medical regime and, also, since the modern internists have appreciated the benefits of modern gastro-intestinal surgery and have referred their chronic intractable ulcer cases for operation promptly and without hesitation. This coöperation and better understanding between the surgeon and the internist have greatly augmented the percentage of cures of peptic ulcer.

In no other field of abdominal surgery, with the exception perhaps, of lesions of the descending sigmoid, is the treatment less standardized than in that of peptic ulcer or where it is more

important for the surgeon to approach the patient's surgical lesion with an open mind. The man who invariably employs the operation of gastro-enterostomy for all types of duodenal ulcer, or who employs a certain type of gastric resection for all types of gastric ulcer is bound to have a large number of unsatisfactory results. The age and condition of the patient, his mode of living, his race and occupation, his psychic reactions to his environment, the age and size of his lesion, its location, the amount of the gastric acidity and the probability of his adherence to a postoperative medical regime are all factors which the thoughtful surgeon should consider well before he decides just which type of operation offers this particular patient the best chance of permanent relief of his symptoms, and which will safeguard him from the possibility of a recurrence of his ulcer. As yet, we have no type of operation that is applicable to all cases.

A wide experience in the treatment of these patients, with a careful study, in the follow-up clinic, of the poor as well as the good results following operation, will be of great assistance to the surgeon in aiding him to decide the type of operation which will promise the given case the best result.

It is important for many of these surgical patients to undergo various periods of medical preparation before an operation may be safely performed. The patient with pyloric obstruction may require a prolonged period of gastric lavages and the administration of hydrochloric acid to render the operation safe. The dehydrated, exsanguinated patient or the one suffer-

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ing from the results of prolonged starvation is in great need of rehabilitation by fluids, glucose, and blood transfusions. Here, coöperation with the internist is of untold value.

Duodenal Ulcer

In spite of all that has been said to the contrary, the operation of gastro-enterostomy is still a good one for chronic indurated ulcer. It is unfortunate that it has been accepted as a cure for all types of duodenal and gastric ulcer and it is more unfortunate that it has been employed in the treatment of ulcers of doubtful existence and for small early duodenal ulcers in young individuals showing no interference with gastric motility and with a very high gastric acidity. It is unfortunate also that this operation has been employed by surgeons whose qualifications to perform this type of surgery may be questioned.

It is far safer and much more permissible to treat the patient with duodenal ulcer medically than the one with gastric ulcer. Medical management, if the patient can be kept under strict and constant observation, should be given a thorough trial but the measure of success depends upon strict attention to the details of the plan. These patients should be acquainted, however, with the symptoms of massive hemorrhage and of acute perforation and they should be told what to do should the symptoms of either complication arise. All experienced surgeons now advise that medical treatment be given a thorough trial in all young patients having small duodenal ulcers with no obstructive symptoms and with a high gastric acidity. The nervous high strung patient whose symptoms are aggravated by an increase of a nervous strain and who runs a high gastric acidity, had better be treated medically, for any type of operation is wont to be followed by a recurrence of his ulcer or worse, by the development of a marginal ulcer.

The history of a recent case describes the uncertainties of the surgical management of a young patient with a distinct ulcer diathesis.

A boy at the age of fourteen developed symptoms of a duodenal ulcer and in 1926, at the age of eighteen, he was operated upon in another clinic for an acute perforation of a duodenal ulcer which was closed surgically. A brief period of relief was obtained, but in 1929 it was necessary to perform a gastro-enterostomy elsewhere. During the later months of 1934 his symptoms recurred and the pain was very severe at night.

In the beginning of 1935 he was operated upon by a prominent surgeon who disconnected the gastro-enterostomy, closed the opening in the stomach, excised a portion of the jejunum containing a jejunal ulcer and closed the jejunum by an end to end anastomosis; a lateral anastomosis between the stomach and duodenum for a recurrent duodenal ulcer was then performed. After a brief period of relief, the symptoms recurred. He could not eat solid food and he vomited soon after taking any food or liquid. He entered this clinic in February, 1936, at which time roentgen examination showed a large ulcer had formed in the stoma of the gastro-duodenostomy and a marked degree of pyloric obstruction was present. Believing that a high gastric resection might protect him from further ulcer formation and relieve his present obstruction, this operation was advised and accepted with alacrity by the patient.

The approach to the pylorus was difficult and time consuming. A large ulcer 3.5 to 4 cm. in diameter, was found in the stoma of the pyloroplasty which had perforated into the under surface of the right lobe of the liver. Mobilization of the ulcer was impossible and as the patient's condition was not good, a rapid cholecysto-gastrostomy was performed (the benefit of a weak alkaline bath being hoped for) and a high jejunostomy for feeding purposes was established. This jejunal feeding is to be continued for six months or a year and will be successfully carried out, as the patient is most coöperative. He has been symptom-free for two months. Of course, a permanent cure cannot be promised and the patient understands the situation fully.

This case is cited to emphasize the uncertainties of the surgical treatment of patients of this type, who might belong to the class which Crile reports success by denervation of the adrenals. Their cure by accepted surgical methods is extremely doubtful.

If, after prolonged medical treatment, the suffering demands that an operation should be performed, we have had better success with the operation suggested and employed by Judd—that of local excision of the cap of the duodenum containing the ulcer, with two-thirds to three-fourths of the sphincter muscle and then performing a gastro-duodenostomy. It is important to remove this much of the sphincter muscle to eliminate pyloric spasm which favors a recurrence. This operation restores the normal continuity of the gastro-intestinal tract and protects the patient from the formation of a marginal jejunal ulcer. This is the purpose of the Finney, the von Haberer, the Wilkie, the Horsley and all types of pyloroplasty. Our experience is meager in all types of pyloroplasty except that recommended by Judd, but our results follow-

ing this procedure have been almost uniformly satisfactory. The operative mortality has been almost nil and the few unsatisfactory results have been found to be due to adhesions of the operative field to the liver or the parietal peritoneum interfering with the normal emptying of the stomach.

Gastro-enterostomy in this type of nervous patient just described is almost uniformly unsatisfactory. In order to perform the Judd operation safely, it is necessary to secure mobilization of the duodenum which has been accomplished in 50 per cent of the ulcer cases in our Clinic.

In the older patient, with a large duodenal ulcer of years' standing, with wide invasion and contraction of the duodenum, with interference with the motive power of the stomach or with pyloric obstruction and with not too high acids, the operation of gastro-enterostomy, correctly performed, offers the patient a splendid chance of permanent cure. This is borne out in the follow-up work in all Clinics where many of these patients are treated.

Balfour showed, in 1927, his results in operating upon 100 physicians, the average time elapsing after operation being eight and one-half years. This group was selected because it represented the chronic case in which the operation was clearly indicated and because physicians have difficulty in carrying out any postoperative regime which demands regularity in habits of living and eating. Posterior gastro-enterostomy was anterior gastro-enterostomy in 3 per cent, and gastro-duodenostomy in 2 per cent. There was complete relief in seventy-eight, or 87.6 per cent; incomplete relief in four; failure in four; and the need for a second operation in three cases.

In 1930, he reported upon the results of 500 consecutive cases of duodenal ulcer operated upon in 1918 and 1919. The results were based upon reports received a minimum of five years after operation. In 87 per cent the patients obtained relief which they had not been able to obtain by any other measures; in 69 per cent the relief was so complete that the patient paid no attention to habits or diet; in 18 per cent the results were classified as fair; and in 13 per cent the patient did not obtain any permanent relief from operation. Diseases overlooked at operation, failure to remove the appendix, functional disorders, marked indiscretions in habits and un-

willingness to carry out a reasonable regime following operation were the commoner reasons for disappointment. The operative mortality in 500 cases was 1.8 per cent, there being nine deaths. There were twenty-one deaths (4.28 per cent) in the 500 patients within five years from all causes. From a standpoint of life expectancy, the Actuarial Society of America found the number of deaths among 500 persons of similar age and sex among the white population in 1910 to be thirty-one for a five-year period.

The treatment of acute perforation of a duodenal ulcer is, of course, immediate operation. The mortality rises rapidly with delay and after twelve hours is very high. The conservative school believes in treating the case as an emergency, closing the perforation and the abdomen with or without drainage and performing a secondary operation should the patient later develop obstructive symptoms. The radical school believes that gastro-enterostomy, after the perforation has been closed, is necessary or that pyloroplasty or pylorotomy are better operations for the condition. We have operated upon seventy-eight of these patients with a mortality of 26.9 per cent. Gastro-enterostomy was performed in but four instances, with a mortality of 50 per cent; the mortality of simple closure was 20 per cent. It was necessary to perform gastro-enterostomy in ten instances as a secondary operation, without mortality. Of the fifty-seven surviving patients in whom simple closure was done more than 95 per cent are well today or were well until their deaths from unrelated causes. We do not employ drainage in any patient operated upon within eight hours after perforation.

Massive hemorrhage is best treated conservatively. Few cases are lost under this plan, since blood transfusions have been employed.

Jejunal Ulcer

The incidence of jejunal ulcer following gastro-enterostomy is a most controversial one. Its occurrence is reported to be from 1.5 to 52 per cent following gastro-enterostomy for duodenal ulcer. Moynihan reported an incidence of 1.6 per cent in 613 cases; Walton found it to occur in 1.2 to 3.2 per cent in two series of cases; Luff reports twenty-one jejunal ulcers (2.8 per cent) in 744 patients; Paterson found

it to be 2.4 per cent in a series of 495 operations; and Wilkie 3.5 per cent in his operations. The reports in this country are quite similar for the incidence varies from 2 to 5 per cent if Lewisohn's and Strauss' statistics are not included. Hinton of New York reported thirteen (16.4 per cent) jejunal ulcers in 79 patients who had gastro-enterostomies performed. Heuer collected reports from seventeen authors and found jejunal ulcer followed gastro-enterostomy in from 0.9 to 6.9 per cent of the cases, the average incidence being 3 per cent. The same author found recurrent or jejunal ulcer in from 0.6 to 6 per cent of cases, or an average of 1.9 per cent following partial gastrectomy.

The symptoms were formerly thought to appear within six months to a year after the original operation, but recent reports show that it is likely to occur many years after the gastro-enterostomy. However, over one-half the cases reported by Judd occurred within the first year following gastro-enterostomy in a series of 586 cases. Lahey, in 50 cases, found 50 per cent to develop within two years. He states, "In general it may be said that the longer the patient goes without ulcer symptoms following gastro-enterostomy, the less likelihood is there of the occurrence of a jejunal ulcer."

The author has recently operated upon two patients who developed jejunal ulcers—one six years after the gastro-enterostomy, the other twenty years after the original operation. This question needs further investigation directed upon older cases which have been classified as cured from reports from a too recent follow-up investigation.

The condition is not difficult to diagnose. A return of the former symptoms, usually without food relief and with the characteristic roentgenographic deformity, make the diagnosis usually certain. A certain few cases will respond to a strict medical regime, but the majority require operation which should not be delayed too long because, should a gastro-jejuno-colic fistula occur, the patient then must be subjected to one of the most difficult and dangerous operations in abdominal surgery. The reported incidence of this complication is from 8 to 10 per cent among jejunal ulcer cases.

Here again let me stress that it is the patient with what might be termed the ulcer diathesis who is prone to develop this distressing com-

plication, and as a prophylactic measure, let me again warn against the use of surgery in the majority of patients of this type having the high gastric acidity and, further, the danger of employing the operation of gastro-enterostomy, should surgery be necessary after prolonged medical treatment.

Faulty technic, the wrong position of the stoma, the use of clamps and the use of non-absorbable suture material are no longer believed to favor the occurrence of jejunal ulcer, as was formerly thought. The radical operation of partial gastrectomy for duodenal ulcer has found little favor with American surgeons. The mortality of the operation of gastro-enterostomy performed by experienced surgeons is less than 2 per cent, while that of partial gastrectomy is from 5 to 8 per cent. The incidence of jejunal ulcer following partial gastrectomy is admittedly lower than that following gastro-enterostomy for duodenal ulcer, but, as the chance of cure following gastro-enterostomy is from 86 to 88 per cent, few American surgeons feel that the greatly added risk of the more radical operation is justifiable.

Gastric Ulcer

Prolonged medical treatment of the patient with gastric ulcer is fraught with much more uncertainty and danger than is the medical treatment of duodenal ulcer, in spite of the fact that the incidence of massive hemorrhage and acute perforation is lower in gastric than in duodenal ulcer. The danger of the ulcer becoming carcinomatous or becoming one of the penetrating type from a subacute perforation must always be kept in mind.

In discussing the incidence of carcinoma following ulcer, the writer realizes that he is opening up a most controversial question, but we are all agreed that carcinoma does follow gastric ulcer and, further, that carcinoma of the stomach is a great misfortune to befall any patient. It must be admitted, also, that it is extremely difficult to cure carcinoma of the stomach by surgery and that its occurrence should be prevented in all possible instances. There is still a heated academic discussion between clinicians and pathologists about the etiological relationship of benign ulcer and carcinoma of the stomach and the percentages reported are as low as 2 per cent and as high as 20 per cent. However, the more

experience we have with gastric ulcer the more convinced we are that it should be looked upon as a surgical problem unless the case gives an immediate satisfactory and continuous response to careful medical treatment. The clinician's responsibility is a heavy one for these patients as a class are floaters and unless the patient can be kept under strict and repeated observation the responsibility of treatment had better not be undertaken.

The size and situation of the ulcer in relation to the pylorus, the duration of the symptoms and the acidity are important points to consider before deciding whether it is safe to attempt medical treatment. The nearer the lesion is to the pyloric end of the stomach, the greater the chance of its being or becoming malignant. If the symptoms are of short duration, the ulcer well away from the pylorus, the acids not low and the patient intelligent enough to give the co-operation necessary, a medical plan may be instituted.

A plan which appears to be a safe and a rational one will be outlined. If, within two months, there has not been a marked diminution in the subjective symptoms, a marked decrease in the ulcer niche shown roentgenographically, and the disappearance of occult blood in the stools, the medical treatment should not assume the responsibility for the safety of the patient. Early ulcerating carcinoma might be temporarily benefited by a strict medical regime. Even should encouraging results be secured within a certain time limit, the conclusion that the lesion is not carcinoma has not been definitely eliminated. Strict adherence to the medical plan and continued improvement, supported by monthly roentgen-ray examination showing further decrease in the ulcer niche with the absence of occult blood in the stools, must maintain for at least a year.

If, at any time, there is a recurrence of subjective symptoms, a reappearance or enlargement of the ulcer niche, a return of the occult blood or a progressive low gastric acidity, the patient should be operated upon without delay. In gastric carcinoma, unfortunately, when the lesion has progressed to a degree that the subjective symptoms, the physical signs and the laboratory

findings are unmistakable, the hope of cure has already vanished.

The real problem is not how many gastric cancers develop upon gastric ulcer, but how may we differentiate early ulcerating adenocarcinoma of the stomach from benign gastric ulcer; this is still a difficult and an uncertain one.

The ulcer near the pylorus may be treated by pylorotomy of the Billroth No. I or II type of operation; the saddle ulcer on the lesser curvature by a sleeve or V resection, a cautery excision with gastro-enterostomy, by a Polya or by a Polya-Balfour antero-colic resection. It is strange to note the infrequency with which jejunal ulcer develops in the stoma of a gastro-enterostomy performed for a gastric ulcer. This may be due, in part, to the lower gastric acidity seen in gastric ulcer than in duodenal cases.

Rare lesions on the greater curvature had best be viewed with great suspicion and an early operation advised, for the majority are malignant. Ulcer high up on the cardia which do not lend themselves readily to a safe resection may, at times, be relieved by putting the stomach at complete rest for several months, while the patient is fed through a jejunostomy.

The postoperative care of the peptic ulcer case is important and refined. One important thing besides support by fluids and glucose should be mentioned and that is the stomach must be kept empty should an ileus develop.

The gastric ulcer requires the same prolonged postoperative medical management as the patient who has been operated upon for duodenal ulcer. Diet, alkalies, discontinuing the use of tobacco and alcohol, rest periods and attention to foci of infection are important. Many more cures would follow operation if our patients would place themselves under the care of their physicians for a year or more after operation.

Let me urge that the surgeon and the internist coöperate more closely in the treatment of these cases preoperatively and postoperatively and let me caution the surgeon to approach each patient, having a peptic ulcer, with an open mind and to consider carefully all the characteristics of the patient and his lesion before he decides what type of operation is best suited to give the relief the patient has every right to expect.

THE TREATMENT OF DIABETES MELLITUS*

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DURING the last fifteen years there has been a gradual revolution in the problem of the treatment of diabetes, because there are so many more diabetics to treat and because they live so much longer. There are more diabetics to treat, half again as many more as shown by mortality tables, because the country is aging rapidly and thus approaching the maximum age of diabetic incidence—fifty to fifty-five years. Whereas, in Boston in 1845, 80 per cent of all the people died under the age of forty years, in Massachusetts, in 1935, 80 per cent of all the people died above the age of forty years.

We are detecting and diagnosing more cases. In Massachusetts, we have 15,000 diabetics and our incidence is a third greater than that in Minnesota, and why? Perhaps age is somewhat of a factor, but I think a more important reason is the discovery of cases hitherto unknown. And I believe in your admirable pamphlet on "Diabetes—How to Make it Harmless," if you should replace one-half of one of the twenty pages devoted to Diets with a few captions—

Diabetes, like consumption, is most successfully treated if discovered early.

Diabetes is hereditary.

Does anyone in your family show sugar in the urine?

Find out and if so call the doctor.

the incidence of diabetes in Minnesota would rise. Whether it would reach the Massachusetts level, I do not know, since diabetes, like coronary thrombosis, is less common among those doing heavy, laborious work and you have more working on farms than in factories and likewise, I presume, a less urban population.

Incidentally, in various other countries, diabetes is growing more rapidly than in the United States and eventually its incidence in these may reach our own. For example, in Italy in ten years, it jumped 82 per cent, from 4.5 per 100,000, in 1920, to 8.2 per 100,000 in 1930.

Now turn to the other factor which increases the number of diabetics in a community at any given time—namely, that dependent upon the duration of the disease. Of course, diabetics live longer today. Take the 1,243 living diabetic veterans studied by Matz. Already they have lived on the average of 9.1 years and those of you who are paying for those little Bonus Bonds in June can estimate whether they, with their present and future pensions, will live longer or shorter than you who provide them.

Undoubtedly, insulin is largely responsible for this increased diabetic life tenure, and this is best realized if one considers the diabetic child. Even as late as the first few years following the discovery of insulin, the life expectancy of the ten-year-old diabetic child was between one and two years as based on the life table of my then living diabetic children calculated by Dr. Louis I. Dublin of the Metropolitan Life Insurance Company, but next week, if you visit the Diabetic Exhibit of the American Medical Association, you will find it to be between thirty-one and thirty-two years! Present that fact to a diabetic and you will not need any longer to urge him to take insulin. (Incidentally, I hope you will not fail to visit that diabetic exhibit in which, as you may know, Dr. Wilder will play a prominent part.)

Diabetes—a Life Problem for Doctor and Patient

For present doctors, diabetes is a life problem and unless the doctor is very young, the diabetic will outlive him. It is for the doctor, when he is once consulted by a diabetic, to hold that patient for life, but how can he do it? This will only be possible if the doctor is able, during each visit of the patient, to demonstrate to him that he knows more than the patient does about the disease and to drive it home by telling him something new and helpful. This is not a light task, because the doctor must not only read his own medical journals, but the newspapers, too! The first thing I did this morning, on

*Paper presented at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, June 5, 1936, with additional observations on the use of protamine insulin.

reaching Rochester, was to ask for this week's *Journal of the American Medical Association*. Could I appear before you without having read the diabetic articles it contained, particularly those from Minnesota? You can readily understand why I wander so much about the country after new ideas. I can't help it. I am chased, day by day, by my living diabetics and, unless I work very hard, kept awake at night by the thoughts of the 4,000 I have buried.

The 1935 Boston Diabetic Survey

In Boston, last year, 301 diabetic patients died. Females were more than twice as many as males. The average age was sixty-four years, in contrast to my diabetic doctors whose average age at death is sixty-eight years. I am thankful to say that no diabetic patient died in Boston during the year 1935 under nineteen years of age.

What are the lessons of the Boston Diabetic Survey as conducted by Dr. Lynch who investigated, personally, each diabetic death? First of all, it became plainly evident that for improvement in the treatment of diabetes in Boston we should concentrate upon the doctors rather than upon the laity. And when we found out that 165 of the 301 deaths took place in hospitals and, indeed, 141 in eight hospitals, we saw our task for 1936 was definitely prescribed and we representatives of those eight hospitals at once began to clean house. We met for dinner and a diabetic evening and discussed the thirty-six deaths, which had been selected from the total 301, because they appeared to be the least excusable. Each one around the table took his quota. We invited a surgeon to be present to comment on the surgical deaths.

Deaths from diabetic coma are needless and yet, in Boston during 1935, there were forty-one of these. I have new proof of the needlessness of coma deaths and it is based on my experience with diabetic doctors. Of my last thirty-two diabetic doctors to die only one died of coma! If doctors will not die of coma, why should their patients? Leaving aside those patients who died in their homes of coma we found that the treatment of diabetic coma in our various hospitals could be greatly improved. It really finally dawned upon us that a report from the laboratory, twelve hours after the coma patient had died, was not particularly useful in the management of his case, that often glucose was given

instead of insulin and almost invariably the dose of insulin was inadequate. Not one of the hospitals represented by the group at the table was innocent. At the Deaconess Hospital, one patient, entered at midnight, lived 190 minutes and died without any insulin because all who saw him, including his wife, a trained nurse—doctors, house officers, supervisors—thought he was having an insulin reaction and the laboratory reports were slow.

Our conclusions upon the treatment of diabetic coma in the hospitals we represented became self-evident. Its treatment must be speeded up. This means prompt reports must be available from the laboratory by night as well as by day. No diabetics were burned up in Boston hospitals, in 1935. Of course not. We have fire drills. If we don't want diabetics to die of coma in hospitals, we must have coma drills! Night or day we should be furnished the laboratory data upon our possible coma cases within sixty minutes of their admission to the hospital.

A word about the treatment of diabetic coma. First of all, don't let your patient get it. Teach him the cardinal rules—if he is sick from any cause: (1) to call a doctor; (2) to go to bed; (3) to take a hot drink every hour; (4) to move his bowels by an enema; (5) to keep warm; (6) to get someone to care for him, and, finally, (7) never to omit insulin while the urine contains sugar.

As for the medical treatment, it is the same old story—make the diagnosis and give insulin and enough of it. We give it every half hour, 10 to 100 units, according to the age of the patient, the severity of the coma, the duration of the coma and the diabetes. And if you do not wash out the stomach, gently, I allow, and your patient dies, do not hold yourself guiltless unless by autopsy you prove the stomach was not dilated. Naturally, you will administer salt solution for dehydration, 1000 to 5000 c.c. in twenty-four hours. Liquids by mouth, hot rather than cold, will be limited at first to 100 c.c. an hour; and when the blood sugar is falling and if the patient, at the end of twelve hours, cannot take nourishment, one should begin to give 10 per cent glucose intravenously or 5 per cent subcutaneously. With such methods we have lost one case of coma among 143 whose onset of diabetes was under the age of fifteen years. None of them has received alkalis or, indeed,

have we given alkalis to any patients since 1917, but we are open-minded enough to consider doing so if an appropriate case appears. Our oldest patient to recover from coma did so at the age of seventy-six years. I believe our total mortality for 318 cases is 11.9 per cent.

The second fact which stood out in our Boston series was the shockingly low number of autopsies. There were only twenty-one, of which sixteen were at the Deaconess. Minnesota does much better. Each fatal case of diabetes should be autopsied and each case of coma must be autopsied, because otherwise a doctor loses respect for his own treatment. Very frequently a death from diabetic coma is not due to coma *per se*.

State Medicine and Diabetes

I do not believe in it. To me, diabetes is a disease for the family doctor to treat in the patient's home. It is individualistic. It is not contagious, but it is hereditary and the family doctor knowing the family can find the new cases and begin to treat them early. He can advise about marriage and children. He knows two diabetic individuals should not marry and raise a family, because, theoretically, all the offspring would contract the disease, although it has been shown that only forty-four in each 100 would do so, because the others would die too soon from other causes to reach the age at which they were fore-ordained and predestinated to develop it. Furthermore, it has been estimated by Pincus and White that 30,000,000 of the inhabitants of this country are hereditary carriers of diabetes anyway and I think it would be impracticable to sterilize them.

Obesity is the chief activating agent among hereditarily predisposed individuals in precipitating diabetes. This teaching is for the doctor to inculcate among the diabetic's relatives. It is especially important in Minnesota. Years ago, I found it took only nine of Dr. Wilder's diabetics at their maximum weight to weigh a ton, whereas, in Massachusetts, I often am shy a few pounds if I put ten on the scale. You might replace another half a page of diet in your committee's pamphlet with a few remarks on obesity.

Moreover, diabetes is a personal disease. The patient does well or poorly according to his own control of it. He needs an intimate relation with a doctor. He never will do as well if he goes to

a dispensary and has a new doctor at each visit, each month, or even each year. He wants a doctor for life, just as much as his doctor wants a patient for life. He ought to see a doctor often and it is the duty of the family doctor to follow him up. My diabetics who die too soon are those, as a rule, who have not visited their family doctor or me. We must put our medical scruples in our pockets and aggressively urge our patients to keep under medical supervision. Although they will probably live on the average for twenty years, they must not neglect treatment. Diabetes is a disease to be respected from beginning to end and neglect to recognize this fact results in a premature death.

Diabetic Islands of Safety

Facilities for treatment should be afforded the general practitioner. He should have an opportunity, just as does a hospital doctor, to secure laboratory tests for, or at, cost for patients with restricted incomes. Laboratories should be subsidized by the state. Each doctor should consider in advance to which hospital he will send a case of coma or gangrene if he has not the facilities to cope with it and he should assure himself that the hospital in question be prepared to treat it efficiently and promptly.

Treatment—Education, Diet, Exercise and Insulin

The treatment of diabetes depends upon (1) education; (2) diet; (3) exercise; and (4) insulin. What I have said thus far relates chiefly to education and you and I are aware of the necessity of it. As to diet, we have barely emerged from a maze of intricate dietetics, but all of us now agree essentially on the division of carbohydrate, protein and fat because insulin has forced our hands. The carbohydrate should be approximately 150 grams, the protein should be adapted to the age, and the fat prescribed in amount sufficient for the caloric needs of the patient. The diet is very easily taught. A slice of bread is an ounce (30 grams) and contains about 18 grams carbohydrate and three slices in the day, 54 grams; a medium-sized orange weighs 150 grams peeled and contains about 15 grams carbohydrate and for three in the day, allow 45 grams; all the 5 per cent and 10 per cent vegetables a diabetic would desire seldom would exceed a content of 20 grams and this

would be the same as a very liberal saucer of a cereal; a gill of milk (4 ounces—120 grams) contains 6 grams and of cream, 4 grams, or a total of 10 grams carbohydrate thus making, with the bread, oranges, vegetables and cereal, a grand total of 150 grams. Substitutions are easily learned.

As to the use of regular insulin, I have nothing to add to what I have recorded either in my books or as published in the *Journal of the American Medical Association* last year, in the official series of articles upon hormones. I would emphasize, however, the insulin prescription which is so useful at the time of surgical operations or in the presence of an infection. In the numerator, designate by initials the qualitative amount of sugar: red, orange, yellow, green, or blue and in the denominator below each initial the quantity of insulin to be injected 20, 15, 10, 5, 0 units, and regulate the frequency of administration so as to keep the patient sugar free.

R	R	O	Y	G	B	
	20	15	10	5	0	every 6 hours

Exercise deserves a more extensive mention. Without it the diabetic is handicapped, but with it the control of the disease is simplified, provided along with it he has enough insulin. But insulin he must have and if he cannot manufacture sufficient of his own, he must buy it. Without insulin the blood sugar of the severe diabetic will rise with exercise, but give him insulin and it will fall as in the case of the normal individual and he will utilize his carbohydrate far better than if he is at rest. Diabetics should work, but if their diabetes is severe, they need insulin to help them to do so.

Protamine Insulin.—The discovery of protamine insulin by Hagedorn of Copenhagen is another revolutionary step in the treatment of diabetes. Clinicians were so overwhelmed with gratitude and satisfaction for the original discovery of insulin, in 1922, by Banting and Best and their co-workers, that few attempts were made by anyone to alter its character. Hagedorn's work, therefore, really is epoch-making. He has demonstrated that it is possible to improve treatment with insulin by prolonging its action and lessening the liability to a sudden lowering of the blood sugar with its embarrassing sequence of symptoms. I have no hesitation,

therefore, so far as my own groups of cases are concerned in recognizing the contribution of Dr. Hagedorn by naming the present era for him as I have already designated various eras since I began practice; namely, the Naunyn Era, 1897-1914; the Allen Era, 1914-1922, and the Banting Era in three divisions, Early, 1922-1925; Middle, 1926-1929; Later, 1930-1935.

Through the courtesy of your officers and the Editors of MINNESOTA MEDICINE, and the *New England Journal of Medicine*, I am able to rearrange the remarks which I made on protamine insulin before your association, so that duplication may be avoided. It so happens that on the same day I spoke before you, my associate, Howard F. Root, presented before the Association of American Physicians a similar paper which has since been published, with additions, in the *New England Journal of Medicine*. This manuscript, therefore, now includes the Introduction to the original paper and the sections upon the Indication for Use of Protamine Insulin and the Conclusions regarding its use, with comments upon the above and represents the opinion of my associates and myself, based upon over 245 cases and as of July 1, instead of April 1, 1936.

The following case reports are illustrative:

Case 1.—Eleven-year-old B. W. showed 10 per cent of urinary sugar upon the morning following the discovery of his diabetes and began the use of protamine insulin forthwith. Thirty units were given before breakfast on the first day, 50 units on the second, third and fourth and upon the fifth day, the urine was sugar-free although the patient had received in the previous twenty-four hours, 210 grams of carbohydrate and 1900 calories. He had no reactions and eleven days later while at home was sugar-free with a normal blood sugar. By that time his insulin had been reduced to 24 units before breakfast. It is true he was a fresh case and a child, but contrast this experience with the inauguration of treatment with former methods.

Case 2.—Mrs. S., a nurse thirty-six years old, so crippled with rheumatoid arthritis that exercise was impossible in the treatment of her diabetes of one year's duration, weighed eighty-four pounds in July, 1935. To control her diabetes she required insulin in enormous amounts, given in four to six doses daily for six months. At one time she took as high as 530 units a day. Since January she has shown improvement, her weight has risen to 117¼ pounds and the insulin was decreased to 240 units administered before meals and on retiring. On January 23 she began protamine insulin and now in April her diabetes is equally well controlled

with insulin once daily, 120 units of the old and 120 units of the new.

Case 3.—R.'s parents told me (E. P. J.) that since her severe reaction ten years ago they had not dared to let her sleep alone. This last autumn, the week after entrance to a college in Boston while at lunch with her mother at a restaurant, she had a reaction so violent that it was necessary to call an ambulance and remove her to a hospital. Immediately she began protamine insulin. Her mother says, "Since R. commenced protamine insulin she has had no reactions. She sleeps alone. You cannot tell, Dr. Joslin, what protamine insulin means to her father and me."

The indications for use of protamine insulin.—

1. A trial should be made with diabetic patients of recent onset, because it is probable that such patients can be controlled with a single daily dose of protamine insulin from the beginning of treatment. Indeed it is our impression that we will never learn what protamine insulin can do until we use it as a remedy *sui generis* and observe patients treated with it exclusively over a period of years.

2. High fasting blood sugar values are a definite indication because of the great advantage to a diabetic in beginning his day with the nearly normal metabolism indicated by a normal blood sugar.

3. Multiplicity of dosage can be avoided by the use of protamine insulin, and the consequent gain in simplicity and convenience of treatment improves the end-results.

4. Sensitivity to insulin as indicated by frequency of reactions constitutes the fourth major indication.

5. Hepatomegaly is an indication, because of the efficacy of protamine insulin in reducing the size of the liver, reported by Hanssen.

6. Lipodystrophy may be favorably affected by the reduced number of injections and lessened acidity of the preparation.

7. Finally, it may prove to be of especial value in mild diabetics, in patients with hyperlipemia, cardiac cases in whom hypoglycemia should be avoided and for the same reason where there are occupational hazards.

Conclusion

With protamine insulin the fundamentals of treatment of diabetes are not changed, but the ideals of treatment are more nearly achieved. Diabetes today is a disease to be respected and

neglect to do so spells disaster. Diet and exercise are as essential as ever. The patient must not overeat, but it seems likely that having determined the insulin dosage for a given quantity of carbohydrates, the protein can be determined by adjustment to the age and size of the patient, the fat regulated by body weight, and even the carbohydrate can vary ten to twenty per cent up or down with comparative impunity.

The simplicity of administration of insulin in one or two doses instead of two, three, or four doses will appeal so generally to patients that the probability is strong that the number of diabetics taking insulin will increase. As a result, the percentage of deaths from coma should fall at an accelerated pace.

The original hope that protamine insulin would be safer, because of the lessened number and severity of insulin reactions which it engenders, has been confirmed.

Addenda

All that has hitherto been said we now not only confirm but wish to record that we are still more enthusiastic about protamine insulin than we were before, can state positively that we have had no new untoward effects, have not observed allergy in any case save the one reported, and concerning that we still have some doubt, and are definitely of the opinion that it is desirable to use protamine insulin more extensively.

Protamine insulin is most easily employed when a diabetic of recent onset comes for treatment. The patient, Case 1, reported above, has continued to do remarkably well, returning to the office July 1, showing no glycosuria, a blood sugar of 0.13 (130 mgs.) per cent during the afternoon and is in perfect condition. His weight has risen from 98 pounds to 102. The attitude of the mother and of the child toward the treatment of diabetes is almost as different from children started on regular insulin with one, two, three or four doses a day, although that method was wonderful, as was the difference in the attitude of the parents of those children from the parents of children before 1922.

The simplicity of treating a fresh case of diabetes is so much greater than changing from old to new insulin that we advise any physician to become acquainted with protamine insulin by using it first with a hitherto untreated diabetic.

When a recent case of diabetes is to be treated

with protamine insulin one should forecast the eventual diet, which would be for the average adult approximately carbohydrate 150 grams, protein 70 grams and fat 90 grams, and then adjust this to the age, weight and occupation of the patient. One would underfeed rather than overfeed the patient, but we are inclined to keep the carbohydrate at the start only a little below the final figure we hope to obtain. The patient is then given before breakfast whatever dose of protamine insulin seems indicated, and within a few days changes in the dosage should enable the doctor to obtain a sugar-free specimen in one of four periods, morning, afternoon, evening or night. So soon as a sugar-free specimen is obtained in one of these four periods one can then adjust the distribution of carbohydrate between the three meals and the lunches in the forenoon, afternoon, or before retiring, so that the carbohydrate load may be lessened at one time of the day where it is not well borne and transfer it to another in which apparently it can be utilized. As a rule, it has been our practice to give one-fifth of the carbohydrate at breakfast and two-fifths at each of the other meals, but we do not hold so rigidly to this with protamine insulin, although in general we have adhered to this principle.

From the above it is evident that protamine insulin makes it still easier than with regular insulin, to give a patient the diet thought to be ideal, although that was quite possible, and if I understand rightly was the method employed especially by R. D. Lawrence in London.

If glycosuria and hyperglycemia persist one simply increases the protamine insulin up to the stage of sugar-free specimens or an approaching insulin reaction.

If glycosuria nearly or wholly disappears in all specimens save the forenoon specimen one would give regular insulin along with the protamine until a normal blood sugar is obtained although always attempting to secure the same object by making transfers of carbohydrate in the diet to adjust it to the insulin dosage. If with or without the aid of the addition of regular insulin to protamine insulin before breakfast, the night specimen continues to show sugar, the indication is to increase the protamine insulin, because we know that protamine insulin will act even longer than twenty-four hours.

If all specimens are sugar free, one obviously reduces the insulin, protamine or regular and protamine combined, by about two units not daily unless in danger of a reaction, but every two or three days and adjusts carbohydrate from one time of the day to another so as to avoid an insulin reaction. If the reaction occurs before noon, naturally the regular insulin is the type to be lowered, but, if the reaction occurs from late afternoon on, the protamine insulin would be the logical type to decrease.

The life of patients in hospitals is far less strenuous than outside and therefore the greatest caution must be given patients on discharge. They must not change the amount of exercise suddenly. Gradually during one or two weeks they should increase it and adjust, probably lowering, the quantity of insulin which they take. The bad reactions we have encountered with protamine insulin have been due largely to neglect of this rule. They are not the fault of protamine insulin, but merely indicate the need for the patient to understand the management of his disease.

All sorts of minor troubles develop with the administration of insulin, old or new, but in general these represent lack of understanding of the management of the diabetes at the particular time. More than ever it is true that the diabetic with knowledge and common sense is the one who will do the best.

Reactions do occur with protamine insulin even if regular insulin is not also employed. They may persist for hours. Case 10268, aged 10, with diabetes of five years' duration left the hospital on May 4, 1936, taking 16 units of regular insulin plus 40 units of protamine insulin at one time before breakfast in the morning (no other insulin during the day). He had done well on this schedule at home, in fact so well that with increased physical activity on his part, his mother had been obliged to lower his insulin dosage in stages to 14 units of regular and 28 units of protamine insulin a day in order to avoid hypoglycemic attacks.

On the morning of July 4 he was unusually active and became so interested in his fireworks that he forgot to take at 10 a. m. the customary 100 c.c. portion of orange juice. At about 11:45 he was found unconscious and in convulsions. His parents were unable to get him to take significant amounts of carbohydrate by mouth and

no improvement was seen after the subcutaneous injection of 1 c.c. of a 1:1000 solution of epinephrine. He was brought in an unconscious state to the Deaconess Hospital at 1:30 p. m. Particularly after stimulation, as by attempts at arousing him, convulsive twitchings of the muscles of the extremities and face were well-marked. The Babinski sign was bilaterally positive. The blood sugar on admission was 57 milligrams per 100 c.c.

During the course of the afternoon three intravenous injections of 20 c.c. of 50 per cent glucose were made at intervals and some 500 c.c. of orange juice and ginger ale were given orally in divided amounts. Despite this, convulsive twitchings were present or could be elicited up until 5 or 6 o'clock in the afternoon. Consciousness to the extent of answering questions was not regained until about 9 p. m. This slow return to normal was all the more striking because of the relative mildness of the hypoglycemia as

judged by blood sugar values. These were 1:30 p. m. (on admission) 57 milligrams per 100 c.c. and 4:00 p. m. 72 milligrams per 100 c.c.

An additional point of interest is that on two occasions during the afternoon, after the intravenous injection of glucose, the Babinski sign became definitely negative after having been bilaterally positive.

It is probably not necessary that the new preparations of protamine insulin be kept constantly in the refrigerator. It is almost certain that the new preparations will keep after mixture for two weeks and possibly for months. Recently Dr. Marble of our group demonstrated that the zinc and calcium-containing varieties, furnished us by the Eli Lilly Company, maintained better suspension at room temperature than did the regular protamine insulin.

Protamine insulin has come to stay, and it is a boon to the diabetic.

DIAGNOSTIC PROBLEMS IN RENAL-URETERAL DISEASE*

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SOMETIME ago, I was agreeably surprised to find that I had a series of renal and ureteral cases, interesting from a diagnostic standpoint. A review of the literature proved that diagnostic problems in this field are not new.

An oft-repeated statement, which emphasizes the deceptive nature of diseases of the kidney and ureter, is that one of the first things to do in the treatment of kidney stone is to remove the appendix! Kelly, Lowsley and Braasch²¹ have reported, at various intervals, that from 30 to 65 per cent of patients with right-sided renal-ureteral lesions have had one or more prior futile operations. Cecil¹² stated that 30 per cent of observed cases of hydronephrosis had previously been explored abdominally. Colby¹⁴ remarked that "disorders of the urinary tract may be so suggestive of lesions of the gastro-intestinal tract that the correct diagnosis is obscured." Leon Bloch,⁴ the Chicago gastroenterologist, in an excellent review of his cases, showed that the

gastro-intestinal manifestations of diseases of urologic origin were varied and many. Finally, Gregg remarked that "all of us have seen battle-scarred abdomens that have had first the appendix removed, then the tubes and ovaries and, lastly, the gallbladder sacrificed, while the pain still remains." It is, therefore, evident that obscure symptoms of renal-ureteral disease, have an historical background which emphasizes their frequency and importance.

To further check the deceptive nature of renal-ureteral lesions, I reviewed a group of eighty cases entered at St. Luke's Hospital during the last five years. These cases did not include the so-called medical diseases. They were a select group in which the surgical side was emphasized and in which the hospital records were quite complete (Chart 1).

This chart emphasizes the fact that in a general hospital most cases are now well studied. It also shows that in most cases, one or more symptoms are present which definitely point to the kidney or ureter as the seat of pathology.

*Read before St. Louis County Medical Society, May 14, 1936.

CHART I. REVIEW OF EIGHTY ST. LUKE'S HOSPITAL RECORDS

Symptom	Renal and ureteral stone	Polycystic kidney	Nephroposes	Tubercular kidney	Hydro-nephroses	Trauma-rupture	Tumors	Pyenephroses	All kidney conditions	Per cent %
Number of cases	47	2	2	10	5	2	7	5	80	100
Pain definitely over kidney region	34		2	3	4	2	2	4	51	64
Pain radiating to genital region	25			2	2	1		2	32	40
No pain	1			1			2		4	5
Mass palpable		1					5		6	7.5
Urinary symptoms										
Hematuria	33			1	1	2	2	1	40	50
Dysuria	36		1	5	2	1	2	2	49	61
Frequency	36		1	6	2		6	4	55	69
Gravel	2								2	2.5
No urinary symptoms	9				2				11	13
Cases with no diagnostic findings		1			1				2	2.5
Laboratory findings:										
Urine										
RBCS	34	2	2	7	4	2	6	3	60	75
WBCS	28	2	2	5	3	2	7	3	52	65
Blood (white count)										
Over 10,000	43	2	2	5	5	2	5	5	69	86
Over 15,000	16	2			5	2	3	5	33	41
X-rays taken	38	2	2	6	5	1	7	5	66	82
Cystoscopic done	33	1	2	5	5	1	5	5	57	71

Since only 2.5 per cent of all the cases had no findings referable to the genito-urinary tract, one must conclude that confusion in diagnosis must be due to other factors.

Sanford³⁹ discusses the need of careful urinary tract investigation in all cases of obscure abdominal pain, where the emergency sign is discarded. He also states that since urgent surgical cases are in the minority, one can usually take time to study the urologic side, with instruments of precision. In a great majority of the latter, one can definitely state that a lesion is or is not in the kidney or ureter.

In this series, fifty-eight of the eighty cases were right-sided and twenty-eight cases (35 per cent) had had prior abdominal operations such as appendectomy, cholecystectomy, and various operations on the uterus and adnexa. As a whole, the chart demonstrates an increasing tendency on the part of the doctors of this section to consider the kidney quite carefully themselves or in consultation with urologists.

From a review of our cases and of the literature, confusion in diagnosis due to unusual features of renal-ureteral disease, may well be studied in four main groups, any combination of which may be present in a single case: (1)

the general symptoms may overshadow the local signs of disease; (2) deceptive anatomical derangements and relationships may be present; (3) confusion may result from extra-renal and ureteral nervous manifestations; (4) absence of many or all of the key symptoms, including obscure cystoscopic, x-ray and laboratory findings, may lead to diagnostic errors.

In discussing the first group, I shall not concern myself with the purely medical aspects of the subject, such as the edema of the gastrointestinal tract in acute nephritis, the hemorrhagic infiltration in chronic nephritis and the diarrhea, vomiting and coma of uremia.¹⁷ I shall briefly review the diagnostic pitfalls of pyelitis, perinephritic abscess and renal lithiasis. General symptoms, of course, can predominate in almost any disease of the kidney or ureter and these instances are cited because of their known tendency to cause confusion in surgical diagnosis.

The conclusions of Lincoln²⁶, in discussing the divergent symptoms of pyelitis, are as follows: (1) pyelitis must be suspected in any unexplainable febrile condition in children; (2) it should always be excluded in acute abdominal conditions, especially appendicitis; (3) it must be

borne in mind, that appendicitis and pyelitis may coexist; (4) the early diagnosis of pyelitis may be difficult because at first there may be no urinary symptoms or even pus in the urine. Added to the above is the fact that chills, fever,



Fig. 1. Intravenous urogram showing non-functioning atrophic right kidney with calculus and hypertrophic left.

indigestion, nausea, vomiting or paralytic ileus may be so pronounced that attention is directed to other than kidney conditions.

Perinephritic abscess may produce general symptoms which are as uncertain in origin as those of pyelitis. Since only 42 per cent are due to kidney lesions, the multiple etiology factor must not be forgotten. Rolnick and Burstein³⁷ state that it is relatively uncommon disease, only an average of eleven cases a year being noted in one of the largest general hospitals in the world (Cook County Hospital). They further state that acute lesions can usually be diagnosed by their intermittent fever and loin pain. Subacute and chronic lesions, however, are often confusing because they may present no other finding, early, than intermittent fever. They emphasize the value of diagnostic puncture as most important in their series of fifty-five cases.

The following case illustrates that accurate diagnosis is often impossible because of the severity of the general symptoms:

Mrs. C. E., aged fifty-five, was admitted to St. Luke's Hospital on June 29, 1935, in a somewhat stuporous

condition. At this time her temperature was 100°, pulse rate 64, respirations 22, blood pressure 190/100, and the white blood count was 17,400. Urinalysis revealed 4 to 6 leukocytes and 6 to 8 erythrocytes per high power field as well as a trace of acetone. Unable to obtain an adequate history, the physical findings suggested the following diagnosis by the intern: "Coronary heart disease; acute congestive heart failure, with moderate pulmonary edema; hypertension."

From relatives it was later ascertained that she had suffered from typhoid fever thirty-five years previously. During the past twenty-five years, complaints of bloating and indigestion after meals were common. Moreover, intermittent attacks of acute abdominal pain, localized mainly in the gallbladder region and accompanied by nausea and vomiting, were noted. Several hours before entering the hospital, the patient had such an attack but more severe than others and she didn't seem to 'snap out of it.' Treatment over a period of years had been given for high blood pressure, heart trouble, gall bladder disease and nervousness.

Two days after admittance she developed a rectal temperature of 107°, became cyanotic, dyspneic, irrational and almost expired. Complete anuria followed and blood nitrogen readings were increased, the creatinin being 3.3 and urea 59. She remained critically ill for several weeks with abdominal distention, occasional vomiting and marked tenderness over the gallbladder. She was too ill for x-ray studies, but as urinary secretion increased and the blood nitrogen dropped to near normal, a marked pyuria was noted. At this time, superficial pyemic abscesses developed over the body.

About one month after the onset, she passed a "shower" of small stones during urination. It is known that multiple vesical calculi are sometimes passed by patients who have been bedridden a long time and that in the male they may arise from the prostate. In this case, intravenous urograms (Fig. 1) revealed an atrophic right kidney with calculus and a hypertrophic left kidney. Cholecystography revealed a non-functioning gallbladder.

This case illustrates that it is difficult to focus attention on the kidneys when the general symptoms are extreme. However, it also shows that a history of hypertension, heart failure and pulmonary edema is consistent with long standing renal lesions. The coexistence of pyelonephritis, renal calculi, collapse following pyemia, reflex anuria and cholecystitis, of course, confused the clinical picture.

From the foregoing discussion it is apparent that general symptoms in renal-uteral disease may result from shock, insufficient elimination of blood nitrogen, or from the toxicity attending acute febrile states.

Differences in diagnosis may result from anatomical abnormalities of the kidneys, which pro-

duce various symptoms. Anomalies in structure, size, number or position, probably constitute the noblest alibi for incorrect diagnosis in renal-ureteral disease. The following case is an interesting example:

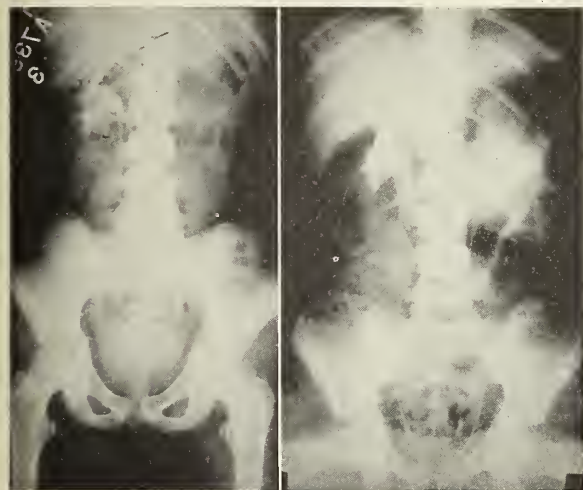


Fig. 2 (left). Intravenous urogram—non-functioning left kidney (aberrant vessel).

Fig. 3 (right). Retrograde pyelogram. Large hydronephrotic left kidney due to aberrant vessel.

L. N., a nine-year-old girl, was first examined by us on July 10, 1933. Since infancy she had a history of repeated attacks of bloating, nausea and vomiting and left abdominal pain. During 1932 and 1933 the attacks became more frequent and severe. They were not accompanied by pain in the left iliocostal space nor by urinary symptoms. The attacks would last from a few hours to two days. The only treatment which afforded relief was hot applications and repeated enemas. Examination at this time was essentially negative except for moderate distention and tenderness on palpation over the upper left abdomen. Temperature, urinalysis and blood chemistry readings were quite normal. Following another acute colic, the left kidney was definitely palpable. An intravenous urogram showed a non-functioning left kidney and retrograde pyelograms showed a left hydronephrosis (Fig. 3). Functional tests were normal on the right but showed delayed or absent excretion in the left kidney.

At operation (Fig. 4), an anomalous artery to the lower pole was found, causing constriction of the ureter just below the pelvis. The latter was greatly dilated and the kidney was enlarged. Left nephrectomy was performed and there have been no recurrent attacks since.

As a rule, most displacements of the kidney cause no symptoms. One must differentiate between "movable kidney" which moves too freely behind the peritoneum, "floating kidney" which is surrounded by peritoneum and suspended into

the peritoneal cavity and, lastly, misplaced kidney.⁸ The latter is not freely movable and may be situated either in the pelvis, at the sacral promontory or at the bifurcation of the aorta.

Due to the loose outer capsule, the kidney



Fig. 4. Left hydronephrotic kidney with aberrant vessel to lower pole.

is movable within certain limits. It has no special ligament to keep it in place and depends for its support upon its fatty cushion, its vascular pedicle and upon intra-abdominal pressure.⁸ Emaciation may lead to loss of the fatty cushion and facilitate displacement.⁶ It is often difficult to evaluate symptoms diagnostic of renal ptosis because many of these patients have no complaints whereas others are not relieved by operation.

W. J. Mayo and A. C. Johnson²⁹ state that from January, 1910, to June, 1926, twenty cases of ectopic kidney were seen at the Mayo Clinic. The symptoms were backache, lower anterior abdominal pain and rectal and vesical tenesmus. Attention is again called to the fact that by its abnormal location, it is without the "fatty cushion" protection and is more susceptible to various pathologic changes.

Chute¹³ cites several cases showing the effect of direct extension of inflammation in producing unusual symptoms in adjacent organs. He concludes that "intestinal symptoms were due to atrophy of the fatty capsule and the binding pain, to adhesions between the colon and the displaced kidney."

Miss A. H., sixteen years old, came to us because of pain in the right lower quadrant of the abdomen. She thought she had appendicitis. Examination revealed a fixed mass, fist sized and moderately tender, located at the brim of the pelvis. The accompanying pyelogram

(Fig. 5) verifies the position of the kidney. The size, functional tests and urinalysis were quite normal. The patient was told of her anomaly and except for advising further observation, no treatment was given.



Fig. 5. Retrograde pyelogram—misplaced right kidney.

A similar left-sided displacement was noted in a twenty-four-year-old male. He came to us because of a lump in the left lower abdomen which became larger and more painful at times. He stated it was movable and that he first noticed it six years before. His main complaints were bloating, constipation and the fact that steady work was impossible because exercise or wearing a belt over the "lump" caused considerable discomfort. Relief was obtained by resting, especially lying down. There were no urinary symptoms.

Examination revealed a fist-sized tender mass to the left of the sacral promontory (Fig. 6) which was somewhat movable. A barium meal and enema proved that it was outside the gastro-intestinal tract. Retrograde pyelograms (Fig. 7) revealed a misplaced left kidney, the catheter being obstructed a short distance from the orifice. Functional tests and urinalysis were normal. The patient is under observation.

Berkman and Priestly² refer to a group of cases in which postural change is of diagnostic importance. These patients usually complain of atypical abdominal pain and the authors state that hydronephrosis was found to be the cause. They state that "unexplained, one-sided abdom-

inal pain, which is aggravated by walking or standing and relieved by reclining, should undergo thorough urologic examination."

In tumors of the kidney, pain is not an out-



Fig. 6 (left). Outline of movable tumor (kidney).

Fig. 7 (right). Intravenous urogram of Figure 6—ectopic left kidney.

standing symptom, except when the tumor itself or hemorrhage from it causes obstruction. According to Harrell,²¹ the diagnosis is usually based on hematuria and a palpable mass. In our series, five out of seven had a palpable mass and six showed red cells in the urine.

In embryonic nephroma, enlargement is an outstanding symptom. Prather and Crabtree,³⁵ in a study of 200 cases, state that it occurs usually before the age of three, that a mass is noted in 80.1 per cent of cases, hematuria in 14.5 per cent, and pain in 5 per cent.

Geshickter and Widenhorn⁸¹ found that 92 per cent of malignant tumors are found in the renal cortex and the most common of these is the malignant nephroma (hypernephroma). These authors further state that they are characterized by occurring in patients over fifty years of age, by early metastases to bones, by enlargement and pain in the flanks and often by hematuria. Pressure on surrounding viscera, therefore, does not seem to be an outstanding feature of kidney tumors.

Pain in the back and flanks with pyuria and fever, but without hematuria or palpable enlargement, was noted in a well studied case by Dr. W. G. Strobel.

The patient, a man, sixty-eight years of age, gave a history of a previous attack of pain in the back and

right side, four years before. He was ill four days and the pain was noted only in these two places.

Twenty-four hours before entering St. Luke's Hospital, he had a recurrence of similar symptoms. At

to visualize the left pelvis, even though considerable sodium iodide was injected into it (Fig. 9). Our diagnosis was polycystic kidney and the accompanying photograph (Fig. 10) shows the tumor mass some-



Fig. 8. Malignant nephroma with pyelonephritis.

this time, urinalysis showed an occasional erythrocyte, moderate pyuria and albuminuria. Because of the pain, mild temperature elevation and a white count of 12,700, it was extremely difficult to know whether the patient had a pyelonephritis, perinephritic abscess or retro-cæcal appendicitis.

Removal of the right kidney by Dr. Strobel (Fig. 8) showed that it contained several prominent rounded nodules in the lower pole and weighed 300 grams. Evidence of a secondary pyelonephritis was sufficient to account for the general symptoms. The possibility of infection accompanying tumor formation and the fact that hematuria and enlargement may not always accompany malignant nephroma, is well illustrated in this case.

The following case report is an example of large abdominal tumor mass, with pressure symptoms due to polycystic kidney:

Mr. A. R., thirty-five years old, consulted us first on February 11, 1935. His complaints were enlargement of the abdomen, a sense of pressure and tenseness, as well as weakness and shortness of breath. The swelling was first noticed in July, 1934. There were no symptoms of dysuria or frequency. Blood nitrogen readings were normal. Urinalysis showed 2 plus albumin and pus.

Intravenous urograms showed no filling of the left kidney or ureter. The right renal shadow and pelvis was enlarged. Retrograde pyelograms failed

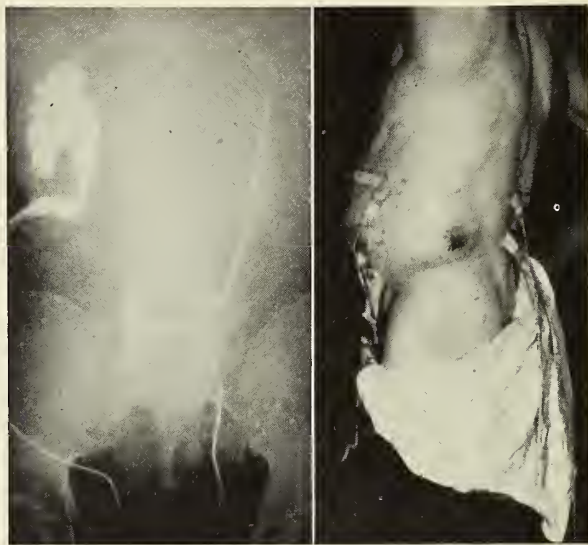


Fig. 9 (left). Retrograde pyelograms—polycystic kidneys.

Fig. 10 (right) Lateral view showing abdominal tumor with sinus, following rupture of several cysts in the left kidney (polycystic kidney).

what reduced in size after nephrostomy and puncture of several cysts.

Polycystic kidneys are not always bilateral as demonstrated in the following case:

Mr. G. O., forty years old, entered the hospital on August 9, 1933, with a tentative diagnosis of chronic nephritis, hypertension and uremia.

The history showed that he had been ill two weeks, complaining of shortness of breath and swelling of the legs, face and hands. One week prior to admittance, he became drowsy and slept considerably. Prior history elicited the fact that he had albuminuria and a blood pressure of 180 as early as eleven years before.

Examination on admittance revealed a dyspneic, edematous patient who was too ill to be well studied. During the first twenty-four hours, only 5 c.c. of urine was excreted. On the next day there was complete suppression, with great increase in the blood nitrogen. Three days after admittance, he expired. The post-mortem specimen (Fig. 11) showed a right polycystic kidney (1005 gms.) and an atrophic arteriosclerotic left kidney.

Polycystic kidneys occasionally assume great size and are usually bilateral. Most of these patients develop symptoms requiring medical attention, between the ages of thirty-five and forty-five. Abdominal tumors, in contrast to pelvic tumors, often attain a large size without

producing pressure symptoms. One must always keep in mind sclerotic kidney, atrophic kidney and autonephrectomy alone or in combination with disease or deformity of the opposite kid-



Fig. 11. Right unilateral polycystic kidney and left arterio-sclerotic kidney.

ney, in explaining some of the fulminating uremias.

Eisendrath,¹⁶ in 1928, discussed abdominal diagnosis and the urologist. In speaking of the diagnosis of abdominal tumors, he formulated several rules which both reviews and emphasizes the importance of the anatomical relationships of the kidneys. These rules should be carefully considered before differentiating intra- and retro-peritoneal abdominal tumors:

1. "The enlargement may have its origin in a normally located and developed viscus."
2. "The location may be at a different level from that of the normal structure either as a result of ptosis or as in the case of the kidney and cæcum, failure to reach the final location, as the result of changes during embryonic life."
3. "There may, as in the case of the kidney, be marked changes both in number and form of the organ."
4. "Routine employment of utero-pyelography (and now intravenous urography) by the urologist in doubtful cases of abdominal tumor,

will differentiate the kidney from adjacent organs and often differentiate various kidney enlargements."

Because it is probably the most common and expressive symptom, pain has often been called the language of disease. In renal-ureteral disease, it frequently is of little diagnostic value because it so often simulates pain due to extrarenal causes, especially those within the abdomen. Local or referred pain may be present alone or both may be noted during an attack. In our series, 64 per cent complained of pain in the renal region, while in forty per cent, the pain was referred to the genitals. Usually it requires more than a history of pain to make a correct diagnosis, but a knowledge of the characteristics of local and referred pain, in diseases of the kidney and ureter, may be of great help.

Head,²³ in 1893, pointed out that pain in an organ itself is "dull, heavy, wearing and not sharp, aching or stabbing like the referred pain." The kidney, in common with other viscera, can be cut, torn or sutured without the production of pain.²¹ This is due to the fact that anatomically, the kidney and other viscera receive many efferent and very few afferent nerve fibers. Anatomically, this nerve supply is derived from the ninth, tenth, eleventh, and twelfth dorsal and the first lumbar segments.^{21,36} Furthermore the capsule proper of the kidney extends over its pelvis and ureter.⁶ Change in tension or muscle spasm, if sudden as in acute hydronephrosis, may cause severe pain, whereas slow distention as in tumors and polycystic kidney may produce a dull ache or no pain at all. In other words, they exhibit very little sensibility except on great and peculiar irritation.⁹

Cannon⁹ has effectively demonstrated the latter point in his work on the sympathetic nervous system. He found that the sympathetics are relatively unimportant in a constant, protected environment, but emphasized their essential function in the conditions of stress and strain. Pain, fever, shock, hemorrhage and dehydration—constitute conditions of stress and strain incident to ureteral and kidney lesions. They are sufficient to cause sympathetic response. The suddenness and intensity of the stimulus will determine the character and distribution of the response.

Osler,³⁴ from personal experience, described two types of local pain in renal colic as follows: (1) "a constant, dull pain, the area of which

could be covered on the skin of the back in the renal region by a penny piece and which could be imitated exactly by deep pressure on a superficial bone"; (2) "flushes or rushes of hot pain

A history of increased pain on exertion is quite typical of urinary tract calculus. Harrah²⁰ states: "A characteristic of urinary tract stone is that the pain is made worse by exercise, es-

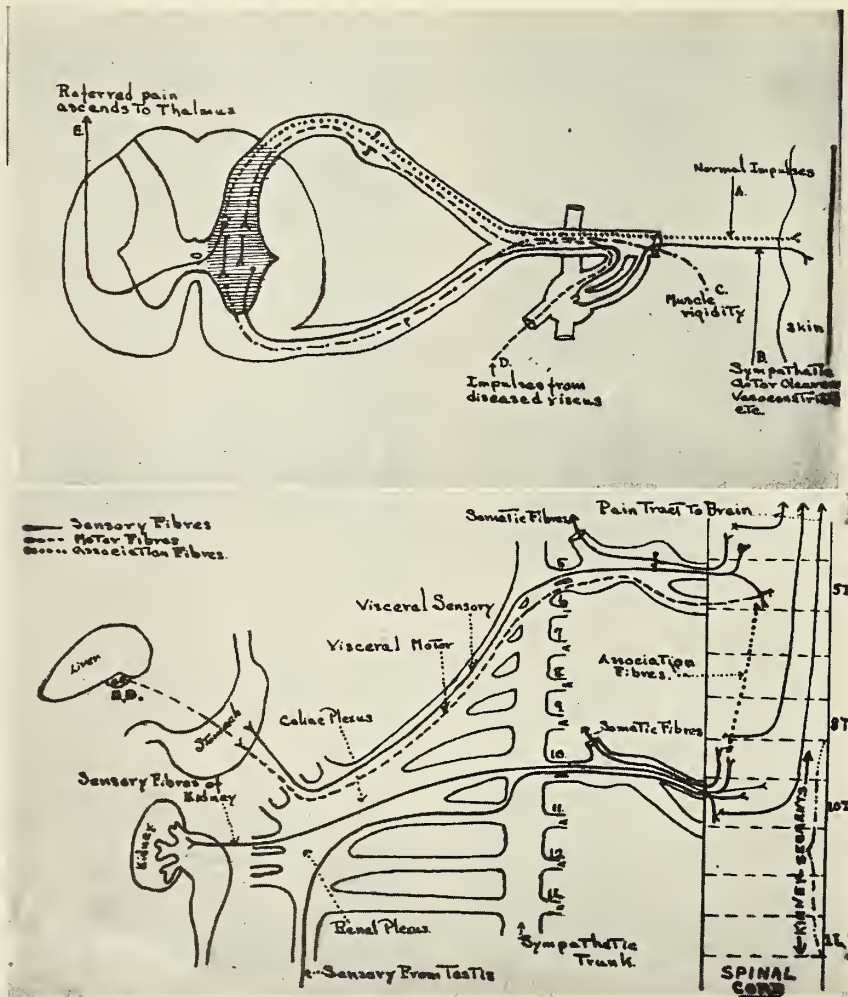


Fig. 12 (above). McKenzie's theory of referred pain (outline).

Fig. 13 (below). Innervation of kidney and ureter. Mechanism of referred pain beyond kidney segments. (Rasmussen.)

at intervals, usually passing to the back—less often to the groin."

Everyone should try to familiarize himself with the means of differentiating backache due to other than urologic conditions. Morris³³ states that the chief conditions which are to be considered as etiologic factors in the production of backache are found in the three branches of medicine, namely, orthopedic, gynecologic and urologic. In an analysis of 3,600 cases, he states that backache of urologic origin was found in 31 per cent.

pecially jolting." The jarring produced by Murphy percussion over the kidney region will often elicit local tenderness in renal disease and should be used more often.

Head²³ remarked "since our viscera are so notoriously insensitve . . . it is not be wondered at, that the maximum pain is *not* felt in the organ affected." Howell²⁵ observed that "localization of pain sensations arising in internal organs is very innacurate, in contrast to the accuracy of localization of cutaneous stimuli." He further showed that the sense of touch or

pressure is much more accurate than pain in localization. Where a portion of skin has lost the sense of pressure and temperature but retained the pain sense, it was found that localization was very incomplete. It may be possible

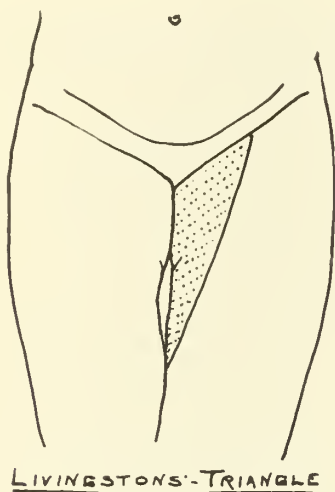


Fig. 14. Livingston's triangle.

that visceral enlargement may cause a sense of pressure, which will act as an experienced guide in the proper projection of kidney pain.

Since the kidney and ureter derive their nerve supply from the same cord segments as the liver, bile ducts, spleen, pancreas, adrenal, ovary, uterus and tubes, testes, diaphragm and appendix,^{21,36} impulses starting in the kidney may be referred to any one of these organs. In the severe colics of the kidney and ureter, extreme radiation of pain beyond the ninth thoracic and the second lumbar segments, may cause deceptive symptoms in more distant organs.

McKenzie's³⁶ theory of referred pain is based on the synaptic overflow of nerve impulses from the autonomic fibers of a diseased viscus (ureter for example) to the adjacent segmental sensory nerve from a skin zone. This will explain (Fig. 12) referred pain to organs in the immediate segmental area of the "irritable focus" thus set up.

Rasmussen³⁶ (Fig. 13) explains, as stated above, that if the pain is unusually intense, there may be a spread up or down the cord, usually up. Depending upon the level of the maximum point of impingement, the brain will assume that this represents the seat of trouble. In general, the more severe the pain, the wider the spread

up or down the cord. Another observation is that if abnormal irritation of a viscus is accompanied by superficial tenderness or pain, this superficial area and the irritated viscus are supplied by sensory fibers from the same segment of the cord. Also, in a given individual the point of impingement (as judged by the referred pain) will be fairly constant from seizure to seizure.³⁶ It is, therefore, not only possible for the intense stimulus to spread to segmental levels far distant from those of the viscus causing the pain, but also for this misreference of pain to be fairly constant in succeeding attacks.

The point of reference of pain in calculus disease may be of definite diagnostic value. According to Salmon,³⁸ "pain in the thigh produced by lesions of the genito-urinary tract are above the bladder, while pain in the penis, scrotum or perineum indicates involvement of the ureter adjacent to the bladder.

Livingston²⁷ described skin signs following acute colic in the upper urinary tract. He outlined a definite triangle, now known as "Livingston's Triangle" (Fig. 14) and bounded as follows: "a line beginning at the middle of Poupart's ligament and running parallel to the sartorius muscle until it reaches the inner border of the thigh, forms the outer side of the triangle; the inner border of the thigh forms the inner triangular border and the inner half of Poupart's ligament forms the third side."

Campbell⁷ states that isolateral cutaneous hyperesthesia over this area is best demonstrated within a period varying from five minutes to a few hours (usually not more than twenty minutes) following either experimental or clinical ureteral colic. He definitely states that "hyperesthesia confined to this triangle and maximal at its center has been found in my experience to be due to no other condition than pyelo-ureteral colic." He warns against improper interpretation of this reflex phenomenon, stating that hyperesthesia may not always fit the triangle. In mild cases it may be present only near its center, while in severe cases it may spread slightly beyond the borders.

The sign is best elicited by the application of coarse stimuli as in roughly twisting the skin between the thumb and forefinger. Besides hyperesthesia, "altered responses to heat and cold as well as localized erythema are also usually observed." It is probably due to the sudden severe

pain, caused by smooth muscle spasm of the upper urinary tract and is the somatic reflection of this internal disturbance.

Most abdominal operations are right-sided. The following case is a typical example.

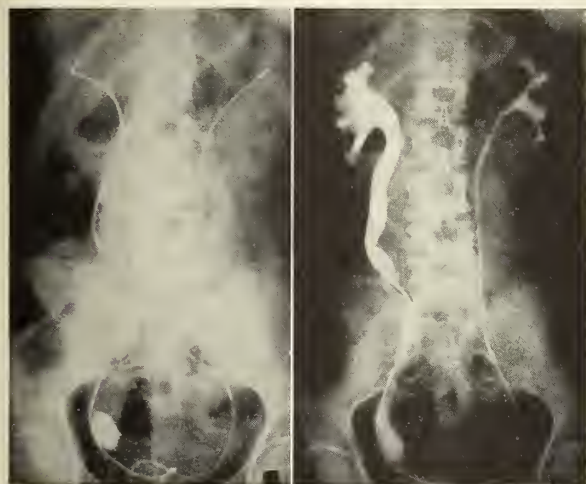


Fig. 15 (left). Calculus lower right ureter.

Fig. 16 (right). Retrograde pyelogram showing obstruction above calculus.

Mrs. G. J. fifty-eight years old, entered St. Luke's Hospital on March 8, 1932. Four years prior, she had been operated on for disease of the gall bladder and appendix, without relief of recurrent attacks of right abdominal pain. In 1929 she was injured in an automobile accident. Since then, the attacks of pain became more frequent and severe, involving both lumbar regions. Recently the attacks were accompanied by chills and fever as well as urinary frequency.

We, of course, saw her at an opportune time and at cystoscopic examination the right ureteral catheter was obstructed 8 cm. from the orifice. On the accompanying x-ray plates (Figs. 15 and 16) a large right ureteral calculus, with accompanying hydroureter and hydronephrosis, was noted and the calculus subsequently removed surgically. Recovery was complete and no recurrence was noted.

* * *

A similar case, Mrs. T., aged forty-two, consulted us because of recurring attacks of pain over the gall-bladder and appendix, although both had been removed two years previously. The pathologic diagnosis on the removed organs was chronic cholecystitis and appendicitis. Pyelograms revealed right pelvic calculus (Fig. 17), removal of which afforded complete relief.

While reflex anuria developing in cases of renal or ureteral calculus is by far the most frequent type,²² many other causes have been cited. It may follow other urinary tract lesions or may be secondary to central or peripheral nerv-

ous stimulation.^{22,41} It has been produced experimentally.^{3,22,29,32} Most urologists have observed the phenomenon during or following ureteral catheterization, when secretion is often arrested for varying periods. It was formerly



Fig. 17. Calculus in upper calyx right kidney.

taught that reflex inhibition of one kidney due to blockage of its mate (contra-lateral anuria, renorenal reflex) was the only true reflex anuria. French states "anuria may occur in patients who have undergone an operation and who are the subjects of renal disease, or may occur when no renal disease is present." Various authors²² have noted that anuria may develop as a result of central irritation, occurring in the collapse following injury, shock, psychic inhibition, hysteria and in the late stages of severe fevers. It is, therefore, obvious that there are two types of reflex anuria. One is secondary to involvement of the urinary system itself and the other is due to extra-urinary causes.

Among Bieters²³ conclusions, based upon his excellent experimental work on the splanchnic regulation of glomerular flow, are the following: "Section of the splanchnics, as an acute effect, results in an increase of glomeruli showing active blood flow. Various measures such as pinching the ureter, applying an irritant locally, both externally and internally, and edema fluid let into the general circulation, result in reflex arrest of glomerular flow. This reflex arrest of glomerular flow is prevented by splanchnic section and cocainization of the part stimulated. The reflex arrest produced by mercuric chloride

in the ureter and collecting ducts appears more pronounced than the reflex arrest coming from within the kidney tubules. These experiments show the marked effect of the splanchnics upon glomerular blood flow and, as far as they are

ure is now explained on the basis of its breaking the reflex nerve tension rather than from releasing capsular tension.

Since the condition is functional rather than organic, it is presumed to have existed in: (1) all those cases in which death occurred and the autopsy showed rather normal kidney and ureters; (2) in those in which function was restored without any residual injury to the organ.⁴¹ I have observed two cases recently which illustrate some of the problems in the diagnosis of reflex anuria.

The very obscurity of an anomaly may allow the patient to go on with indefinite complaints until a sudden, severe attack brings him in to the hospital, too sick to be thoroughly studied. Oliguria and the preuremic symptoms may then confuse the picture, as in the following case.

Mr. E. M., aged thirty-four, was hit by a plow handle in the left kidney region, one week before his admittance to St. Luke's Hospital on June 12, 1934. Following his injury he developed moderate pain in the *left* flank which radiated to the *left* scrotum. He attempted to continue work, but was soon so sick that it was necessary to consult his local doctor. His complaints of shortness of breath, general weakness, nausea and abdominal distention increased hourly until it was deemed advisable to transport him from his home to Duluth, a distance of sixty miles.

Upon his arrival, examination showed him to be critically ill. He was somewhat cyanotic, breathing was labored, pulse was rapid and a blood pressure of 180/110 was noted. At this time, his pain had shifted to the *right* kidney region. A small amount of blood was obtained by catheter on entrance to the hospital. There was complete suppression of urine during the following thirty-six hours. Mounting blood nitrogen readings, as well as general symptoms, pointed to an impending uremia.

On the basis of right sided pain, diathermy stimulation over this area was tried, without response. A consultant at this point suggested right renal decapsulation, but this was not attempted. General supportive treatment as well as the usual methods to promote elimination through the skin, bowel and kidneys, were unsuccessful. The patient died three days after admittance, in uremic coma.

Autopsy revealed (Fig. 18) a congenital absence of the right kidney, with compensatory hypertrophy of the left. The pelvis was partially filled with clotted blood and there was parenchymal hemorrhage over a small area. Moderate hydronephrosis was noted. The capsule was intact.

Rupture of one kidney is not usually as serious as rupture of the liver or spleen. They are normally retroperitoneal and bilateral and the



Fig. 18. Traumatic unilateral kidney after incising pelvis and parenchyma—note clots filling pelvis.

able, tend to explain how local anesthesia and section of renal nerves will produce beneficial results clinically in reflex oliguria and anuria."

It is quite generally agreed that whatever the exciting cause, stimulation of the splanchnic fibers to the kidney, producing vasoconstriction, is the cause of the renal anemia and consequent anuria. Granting this to be true, its stimulation should produce oliguria while exclusion of it by known methods should increase urinary secretion. Several investigators³ have shown that in kidneys that have not suffered extensive structural degeneration, diuresis has followed sectioning of the splanchnic nerves, after renal periarterial sympathectomy,³² after paravertebral block with a local anesthetic²² and following renal decapsulation. Relief from the latter proced-

CHART II.

Date	Jan. 30	Jan. 31	Feb. 1	Feb. 2	Feb. 3	Feb. 4	Feb. 5	Feb. 6	Feb. 7	Feb. 8	Feb. 9
Urea N.	Injured 11 P. M.			35.9		63	98	105	112.9	115	Uremic death
Creatinin				3.8		5.—	6.—	6	7.5	8.5	
Output		900 c.c.	300 c.c.	20 c.c.	70 c.c.	185 c.c.	191 c.c.	150 c.c.	59 c.c.	?	
Fluid intake		2500 c.c.	2900 c.c.	2365 c.c.	3890 c.c.	3200 c.c.	?	?	?	?	
Urine albumin		+	+	Trace		+++				++++	

uninvolved kidney usually compensates. According to McKenna,³¹ the diagnosis of extravasation and the extent of injury are enhanced by intravenous urography. In unilateral kidney, trauma is of course more serious.

Kidney trauma may be accompanied by anuria but this is usually confined to the injured kidney. In our case, the history of injury and pain was left-sided but the pain had shifted to the *right* lumbar region on our first examination. We reasoned that he had bilateral renal injury or reflex anuria but were unable to verify the diagnosis due to the poor general condition of the patient. Autopsy did not prove whether the unilateral kidney stopped secreting because of obstructive blood clots or because of a reflex nervous reaction. It is probable that both played a part in the production of the predominant general symptoms of uremia.

The second case is that of a male physician, thirty-four years old. On January 30, 1936, at about 11 p. m., he fell and struck the back of his head, causing a transverse laceration in the suboccipital region about two inches long. This laceration extended through the thickness of the scalp and there was considerable bleeding from it. It was closed with sutures and he was put to bed with an ice cap.

Several hours later his wife, a graduate nurse, noted that he could not be aroused and that he was pulseless. He was sent to the hospital and on his arrival, he was in a state of extreme shock with a blood pressure of 60/0. He was pulseless and in coma. This was on the morning of January 31. He was given the usual treatment for shock. Spinal puncture showed clear fluid with moderately increased pressure. Within three days he recovered from shock and became quite clear mentally. At this time urinary suppression became evident. From this point on the treatment was based upon the renal insufficiency, illustrated in the following chart (Chart II).

The temperature during this time varied from 99.8° to 102°. The white blood count from 9,300 on admittance to 17,200, three days later. Hemoglobin was quite normal, and the blood pressure rose from 60/0 on admission to 170/86 five days later. The clinical di-

agnosis of the various attending men varied between toxic nephrosis and reflex anuria. Urinalysis for heavier metals was negative, and there was no diarrhea except on stimulation.

The operative findings at the time of decapsulation showed a somewhat enlarged right kidney, but on slitting the capsule it did *not* retract as though under tension. On the other hand, after sectioning the capsule, the cortex was incised slightly in the process of decapsulation. The kidney substance was *gray* in color and the incised area did *not* bleed, although all the surrounding tissues bled freely during operation and the patient's blood pressure was 146/90.

Postmortem findings on March 6, 1936, were, therefore, quite interesting even though performed on an embalmed body, partly frozen and with some post-mortem changes grossly evident. Aside from the transverse suboccipital healed scalp wound, examination of the skull and cranial contents was negative. Besides, all vital organs including the heart, lungs, liver, spleen, stomach and intestines were quite normal aside from the edema accompanying the uremia.

The renal vascular supply, ureters and kidneys themselves were subjected to thorough search for gross and microscopic evidence of disease, in view of the uremic death. Dr. E. T. Bell described the kidneys, ureter and bladder as follows: "The right kidney has been decapulated. There is no hemorrhage about this kidney; it is large, measuring 12.5x7x4.5 m.; the left kidney measures 11.5x7.5x5 cm. The kidneys are in normal position; the right weighs 210 gms., the left 205 gms. No hemorrhages about either kidney. Both renal arteries and veins are normal on careful examination. The pelves of both kidneys are entirely normal, showing no distention whatever; the ureters are normal. The bladder shows a clear mucous membrane with no evidence of disease. The prostate is small.

Microscopic Examination.—Kidneys: fairly normal glomeruli; tubules show no necrosis but for the most part are greatly dilated.

Diagnosis.—Renal insufficiency of undetermined origin.

Dr. Arthur H. Wells of St. Luke's Hospital in an analysis of tissues from the various vital organs found them quite normal except for congestion of lungs and spleen. He described the kidneys microscopically as follows: "The glomeruli in places show a mild congestion, but no inflammatory cell reaction of significance. They are not sclerosed. The tubules in two of

the sections are irregularly dilated and this dilatation involves varied portions of the tubules. Generally the tubules near the surface are not dilated but compressed. The epithelial lining of the tubules is fairly well stained and there is only a small amount of finely granular debris in the lumen. There is no necrosis

nervous stimulation to cause complete occlusion of arteries which are really larger than the size of the organ warrants. In the first case the exciting cause (kidney trauma) involved a unilateral kidney. In the second, it was due to trauma

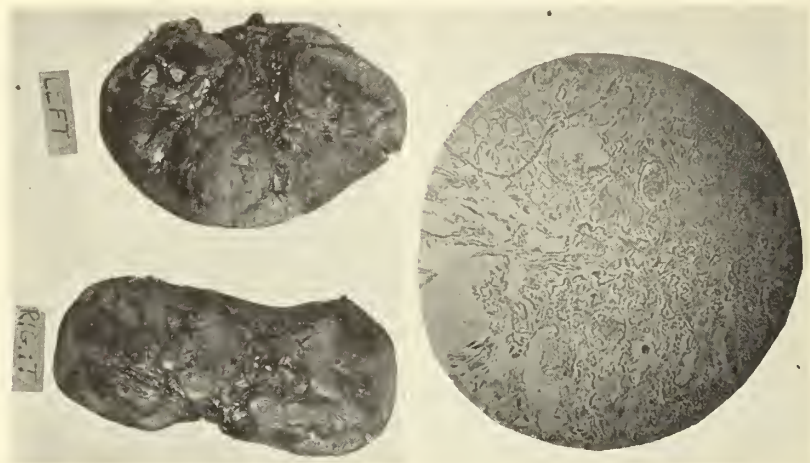


Fig. 19 (left). Longitudinal section. Reflex oliguria.

Fig. 20 (right). Microscopic section left kidney showing dilated and compressed tubules but no other structural changes.

of tubular cells, no active regeneration and very little swelling. The cells are flattened in the dilated tubules. One section shows no such dilatation whatever and the other two are apparently artifacts resulting from embalming. Both large and small blood vessels are not sclerotic."

His microscopic diagnosis was (1) pulmonary congestion (2) splenic congestion (3) post mortem artifacts in kidney and brain. (Figs. 19 and 20.)

It is, therefore, evident that the general anasarca present, as well as the mild cloudy swelling in the kidneys themselves, could well account for both the albuminuria and the moderate enlargement. In my opinion, the absence of urinary evidence of the heavier metals, the patient's absolute denial of taking anything to terminate his life, the lack of ulcerations in the intestines and finally the absence of any change in the tubules or glomeruli, precluded the diagnosis of anything but reflex anuria incident to head injury and delayed shock in this case.

The two cases reviewed above illustrate the many diagnostic problems presented in cases of reflex renal-vascular constriction due to stimulation of the splanchnics. In many instances, the diagnosis can be made only by exclusion of organic causes in the urinary organs. It is my opinion that only the smaller arteries and especially the arterioles are constricted. Even though prerenal and intrarenal vascular constriction has been described as causing differing intravenous urograms,⁴⁴ I am unable to conceive of sufficient

of central origin—thus illustrating the two reflex types—one involving the urinary system and the other due to extraurinary causes.

Uncertainty regarding the presence of renal-ureteral disease, therefore, may often be due to divergent nervous manifestations. One should bear in mind the nature of direct pain in the organ. Careful observation of its intensity, type and point of reference may be of definite diagnostic value.

The key symptoms of urinary disease are pain, hematuria and pyuria. The precision which marks urologic study is derived from proper cystoscopic, x-ray and laboratory interpretation. Confusion may result from the absence of many or all of the cardinal symptoms or from the deceptive nature of the so-called exact corroborative evidence.

Hepler²⁴ states that hydronephrosis may, in the absence of infection, develop to a great extent without producing symptoms. He notes that this is particularly true of *congenital* lesions producing slow obstruction and not causing symptoms until puberty. He has observed that silent hydronephrosis is nearly always left-sided. Right-sided lesions more often involve the duodenum and common bile duct. They, therefore, produce gastro-intestinal symptoms earlier.

Approximately 10 per cent of renal and ureteral calculi do not cast x-ray shadows and in some instances, their presence or passing is symptomless.

Doss,¹⁵ inflammation, neoplasm and foreign body comprise 79 per cent of the causes of hematuria. On the other hand, as a *sign* it is most frequently noted in cases of trauma, tuberculosis and neo-

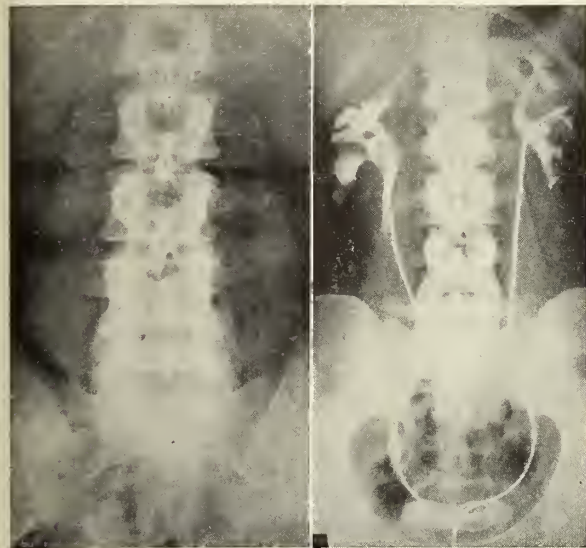


Fig. 21 (left). Negative plate pre-operatively to show renal or ureteral calculus.

Fig. 22 (right). Same with retrograde filling showing rather large pelvic calculus.

A case in mind is Mrs. R., thirty years old, whom I saw in consultation because of nausea, vomiting, low-grade fever and dull pain in the right lower abdomen. Three urinalyses yielded conflicting reports, one showing several red cells microscopically. A flat x-ray plate was taken and reported negative (Fig. 21).

We considered the possibility of shadowless stones (cystine, xanthine, soft stones of albumin, fibrin and blood). However, on the basis of the clinical findings and a white count of 12,000, we made a diagnosis of acute appendicitis.

At operation the appendix was quite normal in appearance. A long search of the right kidney and pelvis elicited no stones. No operating x-ray unit being present, the abdomen was closed, although we suspected we had missed a calculus. Subsequent recurrence of symptoms and retrograde pyelograms (Fig. 22) revealed a calculus in the right renal pelvis which was removed without difficulty.

Interesting in this case was the presence of one negative and one positive x-ray plate on the same stone. Since the chemical composition of the calculus was found to be the type to cast an x-ray shadow, it was assumed that the technic was faulty. The failure to palpate with gloved fingers a renal pelvic or ureteral stone is not surprising. It is sometimes impossible, without an x-ray at operation, to localize the calculus, even when one is certain of its presence.

Hematuria in the upper urinary tract is most often due to ureteral calculi. According to



Fig. 23. Right hypertrophic and left atrophic kidneys (ulcerations in bladder at one time).

plasm. He states that in women inflammatory conditions and calculi of the urinary tract are the commonest causes. However, calculi may produce no bleeding, other symptoms directing attention to them.

Symptoms of renal tuberculosis are sometimes silent but are more often obscured by existing vesical irritability. Caulk¹¹ observes that a simple cystitis usually subsides under ordinary medicinal treatment within ten days. If it continues longer, one should look for other organic disease. Of the ten patients suffering from tuberculous kidney in our series, six complained of frequency and five of dysuria.

One patient who had been treated four weeks prior to operation for simple cystitis, illustrates the dictum that "cystitis alone is seldom a primary disease." The usual typical ulcerations about the ureteral orifice were present.

Bladder ulcerations in this location causing pyuria, frequency and dysuria are not always tuberculous.

Mrs. B., aged fifty-seven, was cystoscoped in 1914 by a competent urologist. He reported "ulcerations of the bladder, particularly on the right side; unable to catheterize right ureter." There was a large amount of pus in the urine.

In 1915 she was cystoscoped elsewhere and told that the left kidney was "dried up." In 1928, she gave a history similar to one we obtained in 1933, namely, that she had two diagnoses made thirteen years previously of tuberculous kidney. Aside from confusion arising from the findings of adenomatous goiter, aortic stenosis and cardiovascular lues, post mortem findings in 1935 were of interest because of the condition of the kidneys (Fig. 23).

You will observe that the left kidney showed marked hypoplasia and atrophy, weighing only ten grams. The right was hypertrophic, weighing 425 grams. There were several scattered non-specific abscesses in the cortex and medulla, evidently a terminal pyelonephritis. No evidence of tuberculosis was noted.

Superimposed biliary tract shadows over the right kidney may be confusing.

A male, G. A., aged sixty, was examined on March 2, 1926, because of repeated attacks of pain over the gallbladder region. Urinalysis was negative, but x-ray plates showed definite stone shadows interpreted as being in the gallbladder.

To my regret, this patient was later operated elsewhere and a right renal calculus removed. The attending surgeon told him at the time that exploration of the gallbladder revealed no stones. However, on his return to this city one year later, he died following an attack of acute abdominal pain, similar to one which I had previously observed. Post mortem showed an acute cholecystitis, cholelithiasis, accompanied by acute pancreatitis.

The presence of shadows suggestive of renal-ureteral calculi, may be due "to foreign bodies in the gastro-intestinal tract, biliary calculi, fecaliths, retroperitoneal and mesenteric enteroliths, calcified venous aneurism, calcified glands, tuberculous lymph nodes and bronchololiths." They may be due to defects in the x-ray film. Calcified areas within the kidney itself may be confusing. The problem of correlating the x-ray picture with the clinical findings may offer considerable difficulty. In any case, a good rule to follow is "when in doubt, study the case further."

Summary

1. The deceptive nature of renal ureteral disease has an historical background which emphasizes its importance.
2. A review of eighty St. Luke's Hospital

cases reveals that most of them exhibited one or more positive findings referable to the urinary tract.

3. Confusion in diagnosis is usually due to other factors. It may be the result of the predominance of general symptoms, anatomical abnormalities and disturbances in adjacent organs, extrarenal and ureteral nervous manifestations or absence or obscurity of many or all of the key findings in urinary tract disease. It is well to remember the axiom "The seaman cannot always avoid the storms but that is no reason for not watching the barometer."

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REFRACTION OF CHILDREN*

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I BELIEVE that every child upon attaining school age should be refracted under a cycloplegic. It should be done regardless of whether the child manifests the slightest abnormality, either local or remote. This, to many of you, sounds radical, and to some ridiculous. Many years of association with the Minneapolis School Board has convinced me that it is a sound procedure. It is not my purpose to burden you with a detailed account of the usual symptoms of eye strain, but, it is necessary for me to outline my reasons for the conclusion.

The ideal time for the refraction of children is just before they begin school. Of course, some should be refracted at an earlier age, notably those with strabismus. It is a most common experience to ask a mother of a child with strabismus why nothing has been done about the child's eyes before, and to have her reply that the family physician has said that the child would probably outgrow it. Certainly a physician who gives a mother such instructions does the child a grievous wrong. The treatment of strabismus should begin as soon as it appears. Incidentally, we encountered two children with convergent strabismus who were found to have choked discs and were sent to neurologists. An early diagnosis of brain tumor was made in each case.

As to the choice of cycloplegic, there is some variance of opinion. In a series of fifty young children chosen in sequence, the refraction was

done first with homatropine and then with atropine. The homatropine was found to be slightly less efficient than atropine, but its action has the great advantage in that it disappears so rapidly. We use homatropine as routine in the refraction of children. Whenever a more complete paralysis is desired, such as in cases of convergent strabismus, atropine is the choice.

Routine fundus examination reveals lesions of the eye which would be a serious handicap to a child beginning school life. Many of these may not affect central vision, and therefore, do not prevent 20/20 vision. Here may be mentioned syphilitic and tuberculous retinitis and also the albuminuric and diabetic forms. Occasionally, we see a pigmentary degeneration of the retina and an optic atrophy.

Thorington⁵ states that in infancy we are nearly all hyperopic. This hyperopia, he says, gradually decreases until at adolescence a state of emetropia is arrived at. Tenner,⁴ in New York, found 91 per cent of the children at five hypermetropic in a series of 4,800 cases. He found that only 48 per cent remained hyperopic at the age of sixteen. Other authors consider hyperopia permanent. I do not know what the usual refractive error of infants is, but, I have had the opportunity of observing ten thousand children in our series from the ages of five or six years until adolescence, and, I have not seen this gradual lessening of the amount of a major hyperopia in more than a few cases. Practically speaking, we do know that the amount of hyperopia does not increase, nor, does the amount of

*Read before the Minnesota Academy of Ophthalmology and Otolaryngology, October 11, 1935.

myopia decrease to any appreciable degree. Therefore, if we refract a child under cycloplegic once and find him without hyperopia, it should not be necessary to refract him again so long as his vision remains normal. The only error that will develop is myopia and that will be revealed by defective vision.

In an analysis of 2,500 cases, Clark³ has found the following:

Same refraction in both eyes.....	657
Emmetropia	9
Hypermetropia	63
Myopia	22
Astigmatism	563
Anisometropia	1,843

This analysis shows the very striking preponderance of astigmatism. Duke-Elder² states that the correction of very small errors frequently result in unexpected and dramatic relief. To emphasize this I wish to cite a case. It is the story of a girl whose infancy and early childhood was marred by frequent convulsions. Any slight cold or dietary indiscretion would bring them on. The child was weak and puny. Pediatricians and neurologists were unable to benefit her. Finally she started school, and her progress was poor. An alert school nurse in checking her vision reported that while she obtained 20/20 vision it was only with great effort. The nurse recommended to the mother that an oculist be consulted. After some delay this was done. A moderate degree of hyperopia with some astigmatism was found and corrected. The change was miraculous. In six months this little girl became a fat, robust, and happy child. Her school work has been brilliant.

Let us consider the child myope. Here the vision is always defective and refraction improves or brings the vision up to normal. Most authors agree that the best treatment is a full correction, avoiding unnecessary reading, encouraging outdoor sports, and promoting general health. Myopia in a child must be considered potentially progressive, and vision should be checked at least every six months. There is a hereditary tendency, and Harmon¹ found this to be 9 per cent. Many theories are given as to the predisposing and underlying etiology. It is a developmental defect. It has been my good fortune to observe two sets of identical twins with progressive myopia. I will describe my findings in one set. On entering school the vision was normal. At seven

years, a myopia of 1.5 diopters was noted and corrected. The amount of myopia was very nearly the same in both twins. For eighteen months they remained stationary, and then they progressed another diopter of myopia followed by another stationary period. The other set of twins under my observation had a similar course. This identical development of myopia in identical twins makes me suspicious that our treatment is of little value in so far as the progression is concerned. I have been unable to find any reference to similar findings in literature.

At present there is a wave of popularity for orthoptic training. Whether the many claims for it can be substantiated I do not know. Certain it is that some of these children with suppression can easily be stimulated to binocular vision and the avoidance of amblyopia exanopsia.

We have in our school system a child guidance clinic for delinquent and incorrigible children. These children are carefully studied and reasons sought for the delinquency. More and more these children are recommended for refraction, and many brilliant results are obtained when refractive errors are corrected. Then there are children who do not quite get into the delinquent class but who are ill natured and a care to their mothers. Often these with properly fitted glasses become happy and lovable children.

Still another class are the subnormals. These children are grouped together in our schools so that they will not be a drag on the progress of normal children. I do not claim that a pair of glasses will give them brains, but we do find that when glasses are needed it often helps them enough so that they are able to join in the class work of normal children.

Children whose vision cannot be brought up to certain standards or suffer from asthenopia due to high refractive errors, should be segregated and given special consideration.

Before a child enters school, the loving mother takes him to the pediatrician and has him immunized to diphtheria and smallpox. His teeth and tonsils, heart and lungs, are carefully checked. She buys him a new suit of clothes and proudly sends him on his way. Who can tell but what a load of hyperopia or astigmatism may be sapping his vitality?

The importance of the relief of eye strain in the health and happiness of children is not emphasized sufficiently. The mention of it in a

majority of books on general medicine is rare and casual. Too often, the ocular cause of the trouble is neglected or thought of as a last expedient when it should have been considered first. One reason for this is that eye strain may not be suspected from the symptoms for many of them bear little or no relation to ocular origin. The eye is our dominant sense organ and in our complex civilization it is subjected more and more to stresses and strains. It seems reasonable

that every child should be given a painstaking refraction before beginning school life.

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BUMPER FRACTURES OF THE TIBIA

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AMONG the more serious fractures of the lower extremity are those produced by the bumper of an automobile. So characteristic are the types of injuries produced and so definitely related to the use of the automobile that Cubbins⁷ and his associates in 1929 termed them "bumper fractures." In the same year Cotton⁴ and Berg named them "fender fractures." These authors refer to fractures at the knee in which the lateral condyle is broken by a medial buckling of the joint due to the sudden application of force on the lateral aspect. In the forced valgus position the internal lateral ligament, though injured, holds and the stronger lateral condyle of the femur is forced against the lateral condyle of the tibia, producing a fracture with various degrees of depression and spreading.

As originally applied to such a fracture, it was not known which term was the more accurate in describing the etiological relationship of the car parts, but "bumper fractures" has been more generally accepted.

Since 1929 automobiles have been built with lower centers of gravity and with lower bumpers. The injuries produced by these cars involve predominantly the shafts of the tibia and are characterized by severe comminution with many larger and smaller fragments, linear fracture lines into the shafts and in the center a diamond or pyramid-shaped piece of cortex. There is usually an associated fracture of the fibula, extensive injury to soft parts, and frequently compounding.

It is unfortunate that these two types, knee and shaft, should be included under the same descriptive term, since the term thereby requires some qualification before it can present a clear picture of a fracture entity.

However, the current low bumpers could not reasonably produce fractures confined to the knee joint, and the characteristically comminuted fractures of the shaft which are produced more truly deserve the name "bumper fractures."

Fractures of the lateral condyle of automobile origin are still being seen, though probably less frequently. Their persistence after the old high bumper is almost entirely absent from the street suggests that Cotton's term of "fender fractures" is the more accurate and should be used to designate the knee type of injury.

The problem of maintaining reduction in the badly comminuted and frequently compounded fractures of the tibial shaft and the problem of restoring the injured knee joint to a condition approximating the normal, continues to concern the conscientious surgeon.

Bumper Fractures at the Minneapolis General Hospital

In reviewing the experience of the fracture service at the Minneapolis General Hospital, it is convenient to present the material first as a whole and then to consider the two types separately.

In the five-year period from 1931 to 1935 inclusive, there were 4,227 patients admitted to the hospital with fractures produced by automobiles.

*Read before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, June 5, 1936.

BUMPER FRACTURES OF THE TIBIA—CAMPBELL

TABLE I.

<i>Incidence</i>	
Total patients admitted with fractures caused by automobiles	4,227
Total patients admitted with bumper fractures.....	148
Percentage of bumper fractures.....	3.5%
<i>Types</i>	
<i>Fractured Condyles</i> —52 Cases	<i>Fractured Shafts</i> —96 Cases
Lateral condyle alone affected in 46 cases.	Associated fracture of the fibula—90% of cases.
<i>Mechanism</i> —Medial buckling of the knee joint caused by force applied to the lateral aspect.	Comminution in 95% of cases.
	Compounding in 42% of cases.
	<i>Mechanism</i> —Shattering by direct force.

TABLE II

<i>Age Incidence</i>	<i>Sex Incidence</i>
90 cases (60%) were 40 or more years of age.	Males—122. Females—26.
71 cases (48%) were 50 or more years of age.	Ratio—5 to 1.

Level of the Fracture Sites (Shafts)

Percentage	1931	1932	1933	1934	1935
In Upper ⅓ of Shaft	65%	75%	47%	50%	45%
In Middle and Lower ⅓ of Shaft	35%	25%	53%	50%	55%

Of this number, 148 were bumper fractures of one or the other type, an incidence of 3.5 per cent. Fifty-two patients had received fractures of the lateral condyle and ninety-six patients fractures of the shaft of the tibia.

Ninety of the 146 patients (60 per cent) were over forty years of age and seventy-one (48 per cent) were over fifty. The age incidence is in accord with the known fact that in most pedestrian accidents the victims are in their later years.

Males predominated over females in the ratio of 5 to 1.

Bumper Fractures of the Shaft

Of the ninety-six patients with fractures of the shaft of the tibia, 90 per cent had associated fractures of the fibula usually at the same level but occasionally at different levels. In 95 per cent of cases, the bones were comminuted and in 42 per cent the injury was compound.

Table II indicates the increasing tendency of these injuries to occur lower in the leg, a tendency to which Stern and Papurt,¹⁸ and Griswold¹³ have already called attention and have attributed to the lower bumpers.

Treatment of Bumper Fractures of the Shaft

The treatment of bumper fractures of the shaft does not differ from the treatment of frac-

tures produced by other mechanisms. The extensive comminution, the frequency of compounded injuries, and the long healing period impose technical difficulties which are not encountered in less severe fractures. Early treatment by traction, reduction, and immobilization with correct alignment of shafts are principles recognized since Hippocrates' writings. Anesthesia and proper attention to the preservation of function are likewise principles of long standing. All variations and advancements in technic have earned their acceptance by better accomplishment of the above mentioned principles. The simplest and safest means which can accomplish the desired result are always to be favored but, because of a mistaken idea of conservatism, the patients should not be deprived of a favorable functional result by failure to utilize methods that involve the use of skeletal traction or open reduction.

Of the ninety-six patients in this series of bumper fractures of the tibia, fifty-six were simple and forty compounded. Of the fifty-six simple fractures, twenty-four (40 per cent) were treated by manipulation and the application of plaster casts. These cases naturally include the less seriously comminuted injuries. Loss of position within the cast happens so frequently that it is considered safer in all except the most favorable cases to initiate treatment with skeletal traction. It is noted that in later years fewer



Fig. 1. C. E., aged fifty-eight. Comminuted and depressed lateral condyle not improved by manipulation. Functional result—80° flexion, marked lateral instability. Permanent disability rating by Industrial Commission 25 per cent.

cases were treated by the application of casts until bony union which was secured under skeletal traction was well started.

It has been found better to utilize skeletal traction to maintain position rather than to secure reduction. Accordingly, the fracture site is anesthetized, a Steinman pin or Kirchner wire is passed through the os calcis, and immediate reduction by traction and manipulation is made. When the most favorable position has been secured, a moulded plaster splint is applied from knee to toes and after the plaster has hardened the extremity is laid in a Braun Boehler splint with 10 to 15 pounds traction. In from three to eight weeks, depending upon the progress of healing, traction is removed and a circular cast applied. No particular attention is paid to the fractured fibula. When the tibia is reduced, the fibula cares for itself and always unites. The position obtained in the union has no relationship to the end-result.

The use of traction and counter-traction by the two-pin method, as described by Boehler¹ and others and advocated by Senger¹⁶ and Norman, Griswold, and others, is finding favor. Several good apparatuses are on the market. Pins passed through the proximal and distal ends of the tibia give good control over the fragments and, what is more important, when incorporated into the cast prevent slipping and obviate the

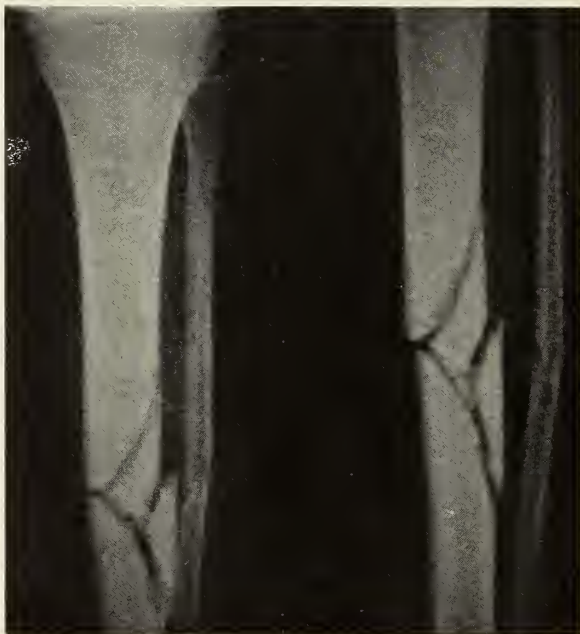


Fig. 2. A. R., aged thirty-four. Typical bumper fracture without wide displacement. Skeletal traction through os calcis six weeks. Full weight bearing in eight months. Functional result good.

need of repeated manipulations. As indicated by Stern and Papurt, repeated manipulations break down the connective tissue and capillary framework upon which bone is laid down and exhaust the regenerative process. Among the causes of non-union Cubbins⁹ and associates list

repeated manipulations and meddlesome testing for motion in the healing fracture.

There is the additional advantage of shortening the period of hospitalization. Griswold re-

was handled like a closed fracture. Ten (25 per cent) of the forty cases were placed immediately in casts while thirty (75 per cent) were treated by skeletal traction on a Braun Boehler

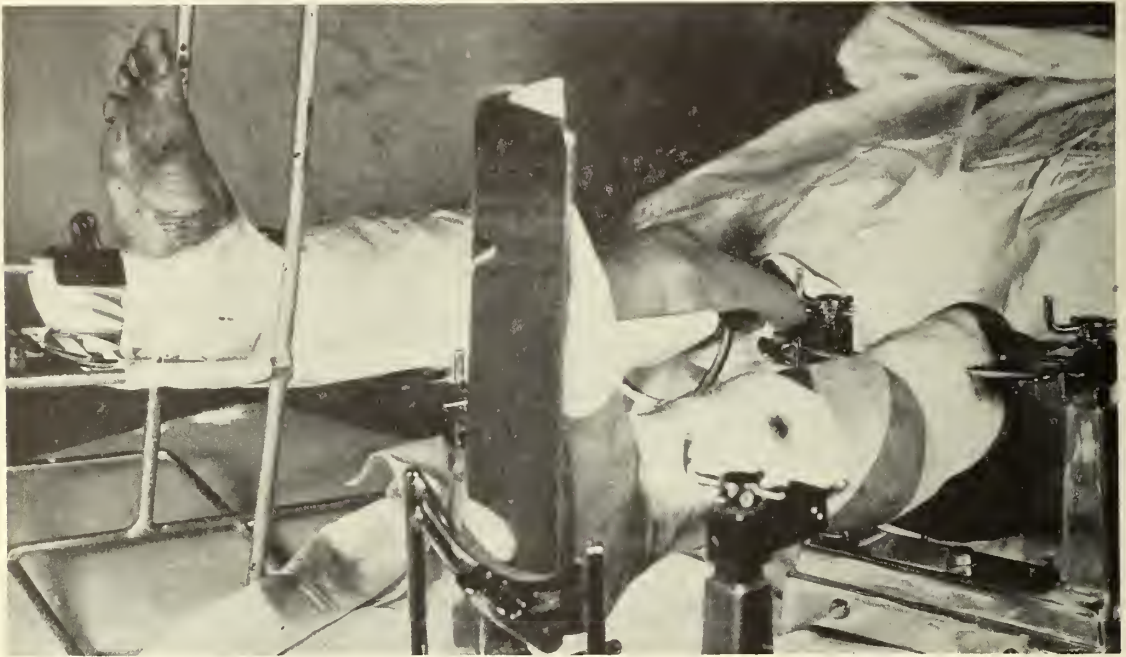


Fig. 3. A. S., aged twenty-eight. Bilateral compounded bumper fractures. Right leg severely compounded. Kirschner wire traction to os calcis. Suspension in Braun Boehler splint. Left leg moderately compounded. Reduction in MacMillan apparatus with two pin fixation in plaster.

ports an average of eight and one-half days' hospitalization for bumper fractures so treated.

Only a few of the later fractures in the above series have been handled in this way but the method will probably supplant skeletal traction except for the most severely compounded cases and those in which infection has already started.

Compound fractures received early, before infection had occurred, were treated by careful debridement, cleansing of the skin and wound, and primary suture. Thereafter, the fracture

splint. Only one amputation was done for infection and there were no deaths from sepsis.

Healing Period

The long healing period of these bumper fractures of the shafts as noted by Stern and Papurt and others can be attributed to the extensive comminution in which a large amount of new bone must become quite solid, to infection associated with compound fracture, and to the poor blood supply of the middle and lower third of

TABLE III. TIME REQUIRED FOR FIRM BONY UNION
AND UNSUPPORTED WEIGHT BEARING
48 Cases Averaged 25.5 weeks or 6 plus months

Type	Upper $\frac{1}{3}$ of Shaft	Middle and Lower $\frac{2}{3}$	Total
Simple	10 cases av. 21.2 weeks	18 cases av. 24.9 weeks	28 cases av. 23.5 weeks
Compound	10 cases av. 23.9 weeks	10 cases av. 32.4 weeks	20 cases av. 28.5 weeks
Total	20 cases av. 22.5 weeks	28 cases av. 27.6 weeks	48 cases av. 25.5 weeks

Fractures in the middle and lower third on the average required five weeks longer for healing than those in the upper third.

Compound fractures on the average required five weeks longer for healing than did simple fractures.

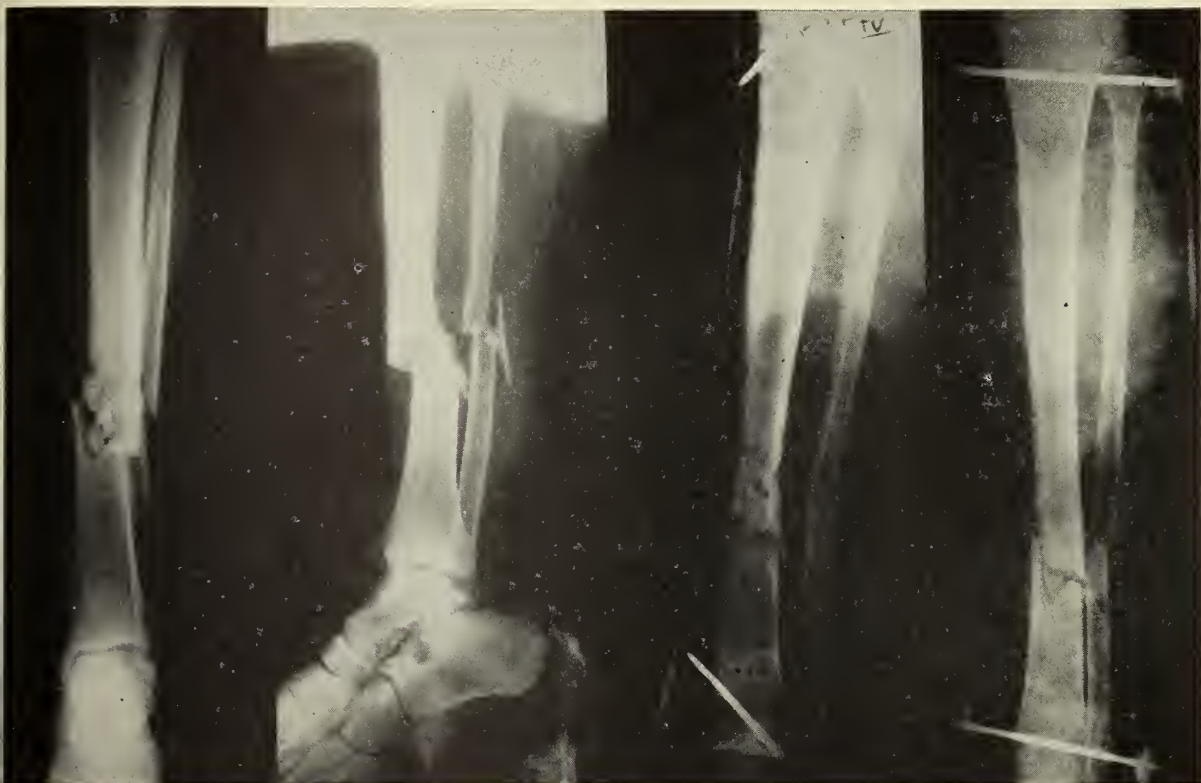


Fig. 4. Illustrating the position secured by the two-pin method as shown in Figure 3.

the tibia. Non-union and delayed union occur more frequently in the lower third of the tibia than in any site in the body excepting the neck of the femur. The two cases of non-union and two cases of delayed union in this series were all fractures in the middle or below the middle of the leg.

Based upon forty-eight fractures of the tibia in which accurate follow-up information was available, the average period required to accomplish firm bony union which would permit unsupported weight-bearing was 25.5 weeks, or six months. Fractures in the middle and lower thirds required on an average five weeks longer for healing than did fractures in the upper third. Compound fractures required on an average five weeks longer for healing than did simple fractures.

It has been the practice to permit weight-bearing in the cast as soon as callus is well established. Under the stimulus of weight-bearing, sluggish callus will sometimes go on quickly to firm union and, even though motion in the joints is not permitted, the muscular exercise limits atrophy and makes rehabilitation of the limb more easily accomplished when the cast is re-

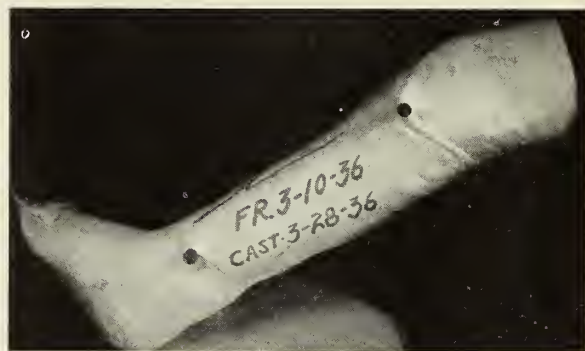


Fig. 5. Appearance of the finished cast in a patient in whom the two-pin method was used. The ends of the pins are shown, covered.

moved. Boehler, Stern and Papurt, and others direct attention to the danger of instituting massage and motion at the expense of an adequate period of immobilization.

Results

There were five deaths in the entire series of 148 cases, a mortality rate of 3.4 per cent. Four of the five deaths occurred in the series of ninety-six fractured shafts. The causes of death are given in Table IV. Cases with multiple injuries resulting in death of the patient within

TABLE IV

Results

Deaths	Cause
2 Simple Fractures	Pneumonia
3 Compound Fractures	Shock Peritonitis Pneumonia

Total 5 of 148—Mortality rate 3.4%

Amputation	Cause
1	Infection
1	Damaged circulation

Total 2 of 148

Fractures of the Shaft

Type	Cases	Anatomical Results			Cases	Functional Results		
		Good	Fair	Poor		Good	Fair	Poor
Simple	37	35	1	1	23	20	2	1
Compound	30	24	4	2	18	15	2	1
Total	67	59	5	3	41	35	4	2

Anatomic Results

Good	Fair	Poor
88%	7.5%	4.5%

Functional Results

Good	Fair	Poor
85%	10%	5%

Non-union 2 cases—Delayed union 2 cases

twenty-four hours were not included in the series.

The anatomic position was noted in sixty-seven of the ninety-six patients. When the end-result showed an offset of not more than half the diameter of the shaft and when the alignment of the shaft was good, the result was rated "good." Eighty-eight per cent were so recorded.

Results were recorded as "fair" when the offset was more than half the diameter of the shaft but when the alignment remained good and no serious shortening occurred. Seven and one-half per cent were so rated.

"Poor" anatomic results were recorded when there was angulation in the fracture causing malalignment or when serious shortening occurred. There were 4.5 per cent so rated.

The functional results could be ascertained in only forty-one patients, of which 85 per cent were recorded as "good," i.e., without pain, shortening, or handicapping loss of motion in contiguous joints. In 10 per cent "fair" results were noted where the patient was to some degree handicapped by pain, stiffness of joints, or shortening. In 5 per cent the end-results constituted a serious handicap to the patient and were rated "poor."

Fender Fractures of the Knee Joint

Of the 148 fractures, fifty-two involved fractures of the lateral condyle, or of the lateral condyle plus the tibial spine, or plus the medial condyle. The lateral condyle alone was involved in forty-six cases.

It is interesting to note that whereas in fractures of the shaft there was no preponderance of one side over the other, in fractures of the lateral condyle there were twice as many injuries on the left as on the right side. This, in conjunction with the notation of a higher percentage of associated injuries in fractures of the shaft, supports the conjecture that patients receiving fractures of the lateral condyle for the most part received glancing blows as they entered the traffic lane nearest the curb, and that the portion of the car causing the damage was the fender or wheel rather than the bumper.

Twelve of the fifty-two cases were mild injuries, six of which required no reduction and were not immobilized. The balance fell into three main groups: (a) those in which the lateral condyle was displaced laterally but not depressed; (b) those in which the condyle was depressed as a whole with little or no comminution; and (c) those in which varying degrees of



Fig. 6. Progress of bony union in fracture previously illustrated in Figure 2.

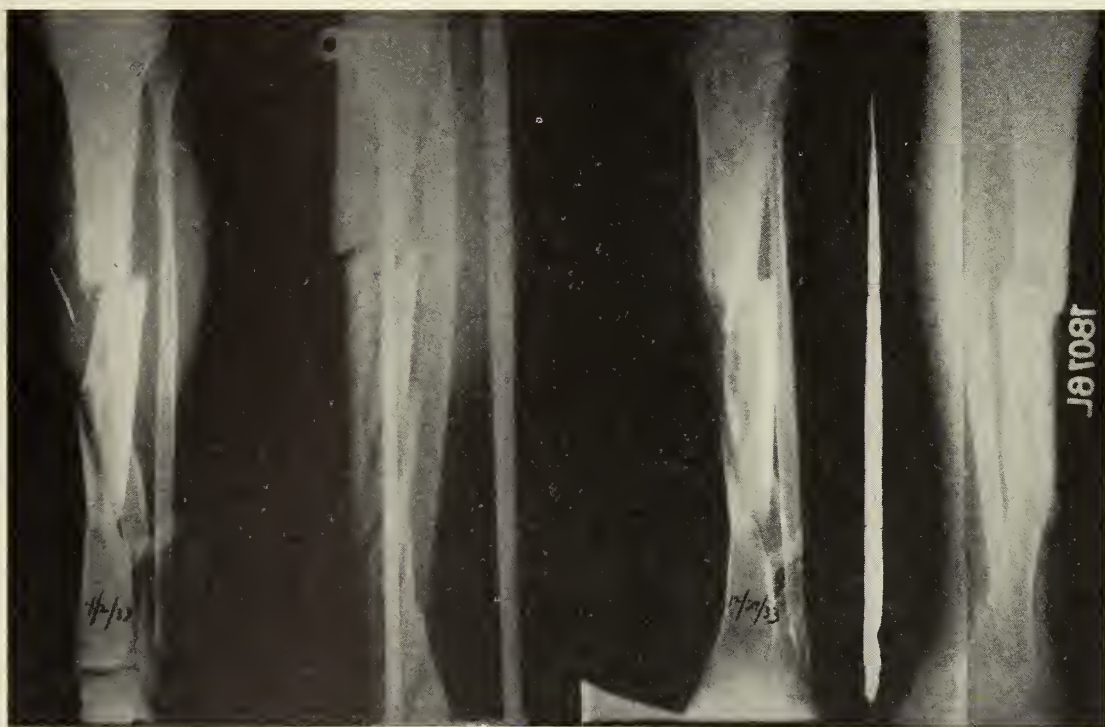


Fig. 7. F. J., aged nineteen. Badly comminuted compound fracture. Fragments maintained in good alignment. Full weight bearing in nine months. Functional result good.

depression and comminution were present. Unfortunately, the latter type predominated. Associated fracture of the head of the fibula was present in most cases. Care in the interpreta-

tion of x-rays is needed. The ordinary anteroposterior and lateral films often failed to show depressions limited to the anterior or posterior part of the condyle.

Treatment

A variety of treatments were recorded. In thirty-one patients, manual manipulation alone was used. The knee was forced into a varus or

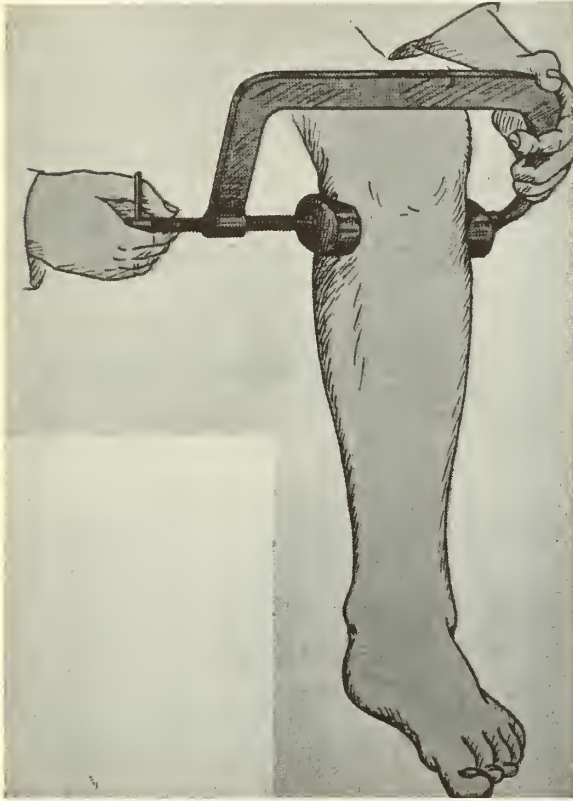


Fig. 8. Forrester's modification of the carpenter's clamp as applied to the condyles.

bow-legged position to place the intact lateral ligament under tension and to pull the displaced tuberosity upward into proper alignment. Lateral spread was counteracted by pressure on the condyle and a plaster cast applied for six weeks.

Traction on the leg which permitted some motion in the knee was used in four cases, manipulation plus the use of the mallet in four cases, and manipulation plus the use of the carpenter's clamp in three cases. Two open operations were done on comminuted depressed condyles which could not be raised by other means, but the operations were undertaken too early, no sizable fragments were found with which to work, and little was accomplished. The method used in two cases was not recorded.

Results

A satisfactory analysis of results obtained cannot be given. Function must be rated not only with regard to the preservation of motion but also to the maintenance of stability. Lateral instability is rated by the Minnesota Industrial Commission at from 10 to 30 per cent of the use of the knee. A knee ankylosed in a favorable position is often preferable to a highly unstable one. It was disappointing to find that accurate observations in both respects were so few. Furthermore, the recorded observations were frequently made before a reasonable healing period had passed. In some patients, motion and stability improves up to eighteen and twenty-four months. In others, irregularities of the joint surface, the presence of loose bodies in the joint, torn semilunar cartilages, or the persistence of a valgus deformity with a consequent strain on the ligaments produce an arthritis which progressively decreases the usefulness of the joint.

In general, it may be stated that functional results paralleled anatomic results. Fracture of the condyle with displacement as a whole and without severe comminution were reduced satisfactorily and the functional results seemed to be for the most part good. Depressed and comminuted condyles were very little influenced by any of the means utilized. Occasionally good functional results were obtained in the presence of considerable unreduced deformity but in general the results in these fractures were not satisfactory.

The Experience of Others

It is useful to look into the experience which others have had with bumper or fender fractures of the knee. Varying views are held toward treatment but most observers are agreed upon the exacting requirements for reduction and the difficulty of meeting such requirements. Early mobilization is emphasized. Most men delay weight-bearing for ten to twelve weeks.

Wilson and Cochrane²⁰ recommend manipulation and very early motion with traction maintained. If manipulation is not sufficient, the condyles are pressed into place by the use of carpenter's clamps as described by Scudder. Favorable cases (i.e., those with large fragments or condyles separated as a whole) lend themselves readily to open operation. A wire bolt



Fig. 9. C. Z., aged forty-five. Fracture of the lateral condyle as a whole. Position improved by manipulation. Functional result excellent with normal motion and stability.

passed through both condyles and tightened holds the fragments firmly and permits early motion.

A similar operative method is used by Webb.²¹ Non-operative means, such as manipulation and carpenter's clamps, are first tried and operation reserved for suitable cases that have not responded to more simple measures. The more severely comminuted fractures are treated by continuous traction in a Thomas splint with a Pearson attachment to permit early motion in the knee.

Forrester¹¹ has modified the carpenter's clamp by adding concave adapters to fit the tibial head. After reduction, a circular cast is applied and the joint immobilized for ten days. Elliptical pieces of the cast are then removed from in front and behind the knee, and knee joint hinges are incorporated into the cast. Motion is started and increased each day until full flexion is obtained. Weight bearing is started at the end of ten weeks.

Magnuson¹⁵ advocates Forrester's method.

Cubbins⁸ and associates believe that the torn lateral meniscus is commonly interposed between the fragments and prevents complete reduction. Detached pieces of articular cartilage and fragmented pieces of meniscus become free bodies and predispose to arthritis. Open operation to

remove these fragments and to elevate the depressed comminuted condyle is recommended. Operation is delayed for three weeks until the fragments of the shattered table become annealed by early callus. An incision is then made opening the joint and exposing the head of the tibia. Loose bodies are removed, the meniscus excised, and the depressed table elevated by an osteotome, and braced with bone chips removed from the tibia. A cast is applied and mobilization delayed four to five weeks. Excellent results in approximately fifty operated cases are reported. Cubbins believes that 40 per cent of the fractured condyles can be markedly improved by operation.

Cotton⁶ has tried open operation on badly comminuted condyles and has abandoned it. (Apparently he operated early without waiting for callus.) Reducing the displaced condyle by manipulation and finger pressure, he holds the position either in a plaster cast or in a Thomas splint with traction and with Pearson's screw pad plates pressing against the condyles. To assist finger pressure in stubborn cases he prefers the hammer to pressure clamps. Even though joint motion is limited in some cases, none of the properly treated cases had lateral instability.



Fig. 10. M. B., aged forty-nine. Moderate depression and spreading of lateral condyle. To recognize the full extent of the depression, oblique views are needed. Position not improved by manipulation. Functional result fair with 105° of flexion but with lateral instability.

Clark² uses the redresseur on spread but not on depressed fractures. If the condyle is depressed as a whole, he does an immediate operation with fixation. In depressed comminuted fractures, he waits three weeks and then elevates the condyle as described by Cubbins. Mobility also is delayed eight to twelve weeks.

Frapp¹² operates only on condyles displaced as a whole but not on those which are comminuted. Mobilization is started after six weeks.

Swett,¹⁹ Collins³ and Eliason¹⁰ frown on open operations and report satisfactory functional results by closed methods only. Eliason and Swett mobilize after six weeks, Collins after four weeks, and Sever¹⁷ not until after eight or nine weeks.

Even with satisfactory functional results, most men report a persistence of a varied degree of valgus deformity. Cubbins prevented such deformity in his operated cases by building up the posterior position of the condyle a little higher than the normal.

The reviewer is left with the feeling that in severe cases uniformly perfect results are unattainable and the results obtained depend more upon the surgeon than upon the method.

Conclusions

1. The inclusion of more than one fracture entity under the same descriptive term is confusing.
2. The term "bumper fracture" of the tibia should be applied only to fractures of the shaft in which the history, level, or the characteristics of the fracture indicate that the bumper of an automobile was the agent which produced the injury.
3. Cotton's term "fender fracture" as applied to depressed fractures of the lateral condyle of the tibia is probably more accurate than Cubbins' term and should be retained.
4. The two pin fixation method shortens hospitalization, avoids repeated manipulations, and is a desirable form of treatment for most fractures which require skeletal traction.
5. Preservation of function is more safely accomplished by weight-bearing within the cast than by early massage and mobilization of contiguous joints.
6. Anatomic restoration of the knee joint is so important to a good functional result that open reduction and fixation is warranted in those cases in which other means fail to bring about such restoration.
7. Cubbins' method of delayed elevation of

the depressed and badly comminuted condyle offers encouraging results and should be considered for these otherwise irreducible injuries.

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END-RESULTS OF TREATMENT OF URINARY INFECTIONS BY THE KETOGENIC DIET*

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SINCE the introduction by Helmholtz⁴ and Clark,¹ in 1931, of the ketogenic diet as a means of treating urinary infections, much has been written of its efficacy in producing immediate sterilization of the urine. As yet, however, little has been found out about the final results, that is, how long the urine will remain sterile. We have recently sent questionnaires to 200 patients who had been dismissed from the clinic a year or more previously with sterile urine following treatment by means of the ketogenic diet. The average length of time since dismissal in these cases was two years. We chose patients consecutively from two groups, one group made up of patients who had been treated in 1931 and 1932, and the other made up of patients treated in the last months of 1933 and early months of 1934. This was done to see if the changes made in the management of the diet made any difference in the end-results. Patients in the first group had been kept on the diet for a longer time, usually from three to four weeks, whereas those in the latter group had been kept on the diet usually only until two sterile cultures of the urine were

obtained on successive days. In addition, the diet used in the latter group of cases contained a higher ratio of fatty acid to glucose.

We have tried many diet ratios and methods of handling patients on the ketogenic diet, and perhaps it is not out of place here to include a brief résumé of our present management. We are now using a diet with a ketogenic-antiketogenic ratio of 4:1, that is, the substances producing ketosis (90 per cent of the fat and 46 per cent of the protein) divided by the substances preventing ketosis (100 per cent of the glucose, 10 per cent of the fat, and 58 per cent of the protein) equals 4. We have found that, other things being equal, the higher the ratio of ketogenic to antiketogenic substances in the diet, the faster ketosis is produced; and as a general rule, the more rapid the production of ketosis, the more intense the ketosis. It has also been found that by such means a higher percentage of patients will secure adequate ketosis. Although a 4:1 ketogenic-antiketogenic diet approaches the limit of palatability, strange as it may seem since we have increased this ratio we have also diminished the complaints about the diet. We believe this paradox can possibly be explained by an im-

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proved diet service: Every effort is made to please the patient's appetite, and the food is served as attractively as possible. Too much emphasis cannot be placed on the importance of hot food, as cold, greasy foods are most distasteful. The need of the closest coöperation between physician and dietician is, therefore, evident.

Acidifying drugs are used when necessary. While, theoretically, there may be advantages in always employing them in conjunction with the ketogenic diet, it is certain that they should not be used when the diet is begun or in some cases ketosis will develop after control of the pH has been lost. Ammonium nitrate and ammonium chloride are the best single acidifiers, and a combination of either of these agents with dilute inorganic acids gives the best known acidification. There is little difference between the various inorganic acids.

A large proportion of patients starting the ketogenic diet will complain of malaise, nausea, and vomiting. We believe that this is attributable to ketosis, and that any ketogenic diet which aims to avoid this complication probably does not produce a very intense ketosis. In our experience the management of these unpleasant symptoms is made much easier if patients are forewarned of the probable occurrence of such symptoms and are told that their presence is an indication that the diet is producing the desired result, thus enhancing the possibility of cure.³ The importance of skipping a meal or two as a means of relieving nausea must be borne in mind; it is distinctly helpful. We have found, too, that ginger ale and chewing gum made for diabetic patients are also of definite value in alleviating these unpleasant reactions. Exercise is probably the best remedy for the symptoms of ketosis. The exact effect cannot be explained, but there is no doubt, clinically, that the more exercise that is taken the better. The ketogenic diet does not produce severe acidosis when the metabolism is normal and has never produced an acidosis that could not easily be controlled by the oral administration of glucose. Patients with abnormal metabolism must be followed more carefully. Diabetics, with the exception of those with the mildest forms of diabetes, should be hospitalized. Those with a gouty diathesis should be on a purine-free diet, should be under treatment for gout, and daily estimations of the uric acid content of the blood should be made. Even with the

most careful precautions an attack of gout is usually precipitated. The patient and physician should in such cases decide whether the cure or the disease is worse. Continual coöperation between the physician and patient is a necessity if this treatment is to be at all successful.

TABLE I. INCIDENCE OF RECURRENCE AMONG 161 PATIENTS WITH BACILLARY INFECTIONS WHO HAD BEEN TREATED BY THE KETOGENIC DIET

	Patients		Per cent	
Total	42	161	26	100
Recurrence	119		74	
No recurrence				
Total males	14	74	19	100
Recurrence	60		81	
No recurrence				
Total females	28	87	32.2	100
Recurrence	59		67.8	
No recurrence				

Bactericidal urine (urine with a beta-oxybutyric acid concentration of more than 0.5 per cent combined with a pH of less than 5.5)⁵ will develop under the management just described in five out of six cases, and sterile cultures of urine will be obtained in two out of three cases of bacillary urinary infection.² As it would be unfortunate to have to abandon a method of treatment as successful as the ketogenic diet because of poor end-results, we were greatly encouraged by the 161 replies to the questionnaire, Table I. In making this table, any urinary symptoms the patient had after leaving the clinic, no matter how mild or of how short duration, were considered as a recurrence. Included also under recurrences are all those cases in which patients returned to the clinic for re-examination and were found to have bacteria in the urine. For the same reason, probably, that fewer men than women are afflicted with chronic urinary infection, the incidence of recurrence among men was found also to be lower.

The various organisms found on recurrence of infection are given in Table II, and the percentage of instances in which the respective organisms occurred is also given. As will be seen, *Aërobacter aërogenes* was found in a considerable number of cases in the series. It is our experience that this organism responds well to the bactericidal properties of ketonurine; it apparently is the source of recurrence in about the same

TABLE II. INCIDENCE OF RECURRENCE ACCORDING TO THE VARIOUS ORGANISMS FOUND

	Escherichia coli, 74.2 per cent*		Aerobacter aëro- genes, 13.8 per cent*		Proteus, 4.8 per cent*		Pseudomonas, 3.6 per cent*	
	Cases	Per cent	Cases	Per cent	Cases	Per cent	Cases	Per cent
Total	123	100	23	100	8	100	6	100
Recurrence	32	26	4	17.4	4	50	1	16.6
No recurrence	91	74	19	82.6	4	50	5	83.4
	Salmonella, 1.8 per cent*		Alcaligenes, 1.2 per cent*		Shigella, 0.6 per cent		Grand total	
	Cases	Per cent	Cases	Per cent	Cases	Per cent	In- stances†	Per cent
Total	3	100	2	100	1	100	166	100
Recurrence	1	33.3	0	0	0	0	42	25
No recurrence	2	66.6	2	100	1	100	124	75

*Percentage of instances in which respective organisms were found.

†In some cases more than one organism was found, hence number of instances is greater than number of cases.

TABLE III. TIME OF DEVELOPMENT AND SEVERITY OF RECURRENCE

	Recurrence in										
	0 to 3 months		3 to 6 months		6 to 12 months		1 to 2 years		2 years +		
	Mild	Severe	Mild	Severe	Mild	Severe	Mild	Severe	Mild	Severe	
Males	4	4	0	1	2	1	1	0	1	0	14
Females	7	3	2	1	2	1	9	0	3	0	28
Total	11	7	2	2	4	2	10	0	4	0	42
Grand total	18		4		6		10		4		42
Per cent	60.1		0.9		14.3		23.8		0.9		100

proportion as the other organisms. It will be noticed that there is no important difference in the incidence of recurrence of the various organisms with the exception of *Bacillus proteus*. This organism is not only the most difficult to eradicate from the urinary tract, but it also has a high incidence of recurrence, and since this organism is seldom, if ever, a normal inhabitant of the urinary tract, the importance of asepsis in urologic technic can be seen. In the cases in which multiple organisms were originally present, never more than one type of organism was present on examination following recurrence.

There was a large number of early recurrences, Table III. Of course, there is some doubt as to whether these are all real recurrences or whether they are not merely continuations of the original infection. In reviewing the cases in the 1931 and 1932 group, in which the patients were kept on the diet for a considerable time, only one woman had early recurrence. Three men had early recurrence of infection, all of whom had severe prostatitis. Two of these men, if they were to enter the clinic now, would be subjected to transurethral procedures on the prostate gland because of old prostatic abscesses.⁷ In other words, in

spite of the prolonged course on the ketogenic diet, the urinary infection in these cases was probably not eradicated. Rector and Wheeler,⁶ as well as Wilson,⁸ have advised one week on the ketogenic diet after the culture of the urine is sterile, and Clark does not dismiss patients until three negative Gram-stains at intervals of two days have been obtained.

It seems clear that we have not been demanding sufficient evidence that the infection has been eradicated. We do not plan to return to a three-week course of diet, but we do plan to increase the number of sterile cultures of urine before the patient is dismissed. The use of the Gram-stain is an important aid in judging when the infection is eradicated. When the number of bacteria is small, as it will be when the urine is bactericidal, the urine should be centrifuged for a short time to clear it of pus, then the cleared urine should be centrifuged at high speed for at least an hour. The sediment obtained should be examined carefully. Culture of the urinary sediment after this method has been employed will reliably indicate whether or not the infection has been eradicated. If one is not pressed for time, it is certainly the wisest procedure to continue

the ketogenic diet as long as the urine remains bactericidal. However, when time is an important factor, the patient must be taken off the diet as soon as it is absolutely safe to do so.

Seventy-four per cent of the recurrences were classified as mild, and in several cases they were probably not true recurrences. For example, one woman complained of urinary symptoms on passage of a stone a year after dismissal; another woman had urinary symptoms following post-operative catheterization nine months after treatment by ketogenic diet. Four of these patients with recurrences have returned to the clinic for further treatment and have remained well following a second course on the ketogenic diet.

A subject of utmost interest to the patients is the proper regimen for them to follow after dismissal so as to minimize the possibility of recurrence. Many will have the idea that their diet should continue to be high in butter and cream. This, of course, is not so, as there is only one kind of effective ketogenic diet and that is the one which produces sufficient ketosis to raise the beta-oxybutyric acid concentration of the urine to at least 0.5 per cent. Routinely we advise continuation of urinary acidification for ten days after the ketogenic diet has been stopped, and the taking of acidifying drugs thereafter during alternate weeks for six or eight weeks. Foci of infection should be eliminated, if possible, and intestinal stasis, if present, should be corrected. The exact rôle of these two factors in the production of urinary infection has not definitely been settled, but we have seen many cases in which foci of infection seemed to play a large part.

Much more definite causes of recurrence are anomalies of the urinary tract and foci of infection within the urinary tract itself. The part such anomalies play in producing urinary stasis and resulting infection is well known. Among men, prostatitis is evidently the single greatest cause of recurrence, and to be more specific, prostatitis caused by a bacillus, of which *Escherichia coli* is the chief offender. This is so invariably true that we believe we can predict with great accuracy whether recurrence will develop merely by culture of the prostatic secretion after the urine has been sterilized. The treatment of prostatitis, then, becomes an important adjunct to treatment with the ketogenic diet. By analogy

one would expect that the foregoing would be true also of the female urethra, but so far we have little evidence to support such an idea; nevertheless we advise eradication of foci of infection in the female urethra also. This would seem to make a strong case for the hypothesis of ascending urinary infection; it must be remembered, however, that in many cases of recurrence the mode of infection cannot be determined.

Once recurrence has developed, use of the ketogenic diet at home has a definite place in the treatment. While some authorities believe that the ketogenic diet can be administered only under conditions approaching hospitalization, we have found that patients can follow the diet at home quite well, especially if it has previously been followed under supervision. There is no doubt that the low-calorie diet advised by Nesbit has great possibilities for use in the home. However, it has been our experience that a diet low in calories does not produce as rapid or intense ketosis as does one high in calories. A ketogenic diet for home use, which has been quite successful, together with a few suggestions as to its application, is given in Table IV. This diet for use in the home has a 4:1 ketogenic-antiketogenic ratio, which is the same as is used now at the clinic. It can be prepared and followed quite easily and has proved in our experience to be an adequate means of treatment.

Fourteen of the 42 patients who suffered from recurrence of urinary infection followed this home diet. All reported benefit; three said they were cured, eight that they were markedly benefited, and three reported moderate relief of symptoms. Two additional patients reported control of their symptoms by the use of acidifying drugs alone.

TABLE IV. KETOGENIC DIET FOR USE IN THE HOME

General Instructions: 1. This diet is most valuable in the treatment of bacillary infections. Identification of the specific bacteria present may be made by Gram-staining the urinary sediment or by culture of the urine.

2. A bactericidal urine is necessary, that is, the pH of the urine should be less than 5.5 and the concentration of beta-oxybutyric acid in the urine should be 0.5 per cent or greater.

3. Acidifying drugs are used only when sufficient acidification of the urine does not develop from ketosis alone.

4. Daily observation of the patient and appropriate tests of urine are essential. This should include: de-

termination of the pH, estimation of the concentration of beta-oxybutyric acid, and examination of the wet smear from the urinary sediment and of the Gram-stain of the dried smear.

5. The treatment of associated coccus infections should not be neglected. Neoarsphenamine, 0.3 gm. at intervals of five days for three doses, is of value.

6. Foci of infection elsewhere in the body and associated pathologic conditions in the urinary tract should be treated. In almost all cases this will include the treatment of prostatitis in males and of urethritis in females.

7. The ketogenic diet is a diet very low in carbohydrate and high in fat. It must be adhered to strictly. No other foods, medicines, or liquids except those prescribed can be taken. Chewing gum, chewing tobacco, saline or sweetened cathartics, and alkalies of any kind are forbidden. Water in moderate quantities is allowed.

8. Malaise, nausea, and vomiting are frequent complications of ketosis. Small sips of unsweetened tomato juice, orange juice, or ginger ale (which have no food value) may relieve the symptoms and enable the patient to continue the diet. If nausea persists, it may be advisable to decrease the total intake of food to one-half, or to institute a day of fasting. Considerable exercise seems to make patients tolerate the diet better.

9. Constipation can be treated by agar-agar, mineral oil or *bitter* cascara.

10. The diet should not be continued after ketone bodies have disappeared from the urine: ordinarily this will be about ten days after the diet is begun. It must be remembered that a second course on the diet after a rest period of two weeks may be more successful.

11. Ketosis must be developed and maintained. It should be stressed that good results will be obtained by the ketogenic diet only when these instructions are followed implicitly. Especially is it important that the patient cooperate completely and that the physician follow meticulously the patient's daily progress.

Ketogenic diet.—A, B and C of printed instructions.

A

KETOGENIC DIET

Breakfast

Egg	1
Bacon	5 strips
Cream (40% fat)	$\frac{1}{2}$ cup
Butter	2 squares
Coffee	

Lunch

Eggs	2
or meat substitution	
Vegetables or Salad (1 serving)	See list of foods allowed
Butter	4 squares
Cream (40% fat)	1 cup

Dinner

Clear broth (if desired)	
Meat	1 small serving
Vegetables or Salad (1 serving)	See list of foods allowed
Butter	4 squares
Mayonnaise or French dressing (see recipe) or Butter	1 tablespoon
Cream (40% fat)	1 cup

FOODS ALLOWED

I. Meats, Fish, Cheese and Eggs

Any kind of meat or fish is allowed, but fat meats are preferable. All meats are prepared without the addition of flour. Butter allowed in the diet may be used in the preparation of foods. Eggs or cheese may be substituted for meat.

1. Two eggs in place of one serving of meat.
2. Two one-inch cubes of American cheese in place of one serving of meat.
3. One egg and 1 extra square of butter may be used in place of 5 strips of bacon.

Meat servings.

1. Pork chops	1 medium
2. Steaks	1 small
3. Roast lamb	1 small serving
4. Lamb chops	2 small chops
5. Roast beef	1 small serving
6. Sardines	$\frac{1}{4}$ of a six ounce can
7. Salmon	$\frac{1}{8}$ of a 16 ounce can
8. Chicken	1 thigh or equal amount
9. Goose	$\frac{1}{2}$ thigh or equal amount
10. Duck	same as chicken

II. Vegetables

1. Tomatoes	$\frac{1}{2}$ cup
2. Spinach	$\frac{1}{2}$ cup
3. Tiny string beans	$\frac{1}{2}$ cup
4. Stewed cabbage or sauerkraut	$\frac{1}{2}$ cup
5. Stewed celery	$\frac{1}{2}$ cup
6. Asparagus	3 stalks
7. Cauliflower	1 small section

B

III. Salads

Salads may be made of vegetables listed

1. Lettuce	$\frac{1}{6}$ small head
2. Fresh tomato	2 small slices
3. Asparagus	3 stalks
4. Shredded cabbage	1 cup lightly packed
5. Tomato and cucumber	$\frac{1}{3}$ slice tomato $\frac{1}{3}$ slices cucumber
6. Tomato and lettuce	$\frac{1}{3}$ slice tomato $\frac{1}{6}$ head lettuce
7. Celery heart and radish	$\frac{1}{4}$ celery heart 1 radish
8. Lettuce and cucumber	$\frac{1}{8}$ head lettuce $\frac{1}{3}$ slices cucumber

IV. Breads

Six slices of aerated bread, $\frac{1}{4}$ inch thick, may be taken daily if desired. (Purchased from Montgomery Ward and Co.)

Cellu Bran Wafers (1 each meal if desired; have no food value; purchased from Chicago Dietetic Supply Co.)

V. Soups (no flour to be included in the making of these)

1. Any meat broth (May be taken if desired. It has practically no food value.)
2. Cream soups (Made of vegetable and cream allowed in the diet.)
3. Vegetable soup (Using vegetables allowed in the diet in combination with meat broth.)

VI. Butter and Mayonnaise (see recipe for mayonnaise—commercial mayonnaise is to be avoided)

1. Butter may be used in preparation of meats, eggs, vegetables and broths or soups.
2. Butter may be used in place of mayonnaise. 1½ squares (15 gms.) butter for 1 tablespoon (15 gms.) mayonnaise.
3. Total butter for day should be 1/5 to 1/4 pound. This is best measured out in the morning and consumed by the end of the day.

VII. Cream

It is very important to use heavy whipping cream (40% fat content). If 40% cream is not available, the diet must be recalculated and more butter and mayonnaise added. Cream may be used in preparing custards, ice cream, cream soups, egg-nog and cocoa, and on vegetables. If required amount of cream cannot be tolerated at meal time, it may be taken between meals with coffee, or as cocoa or egg-nog.

VIII. Beverages

Coffee
Tea
Egg-nog
Cocoa—hot or cold
(Saccharin may be used as a sweetening agent.)

IX. Condiments

Salt
Pepper
Vinegar
Spices

C

RECIPES

Mayonnaise

Salad oil	1¼ cups
Paprika (if desired)	1/8 teaspoon
Vinegar	1½ tablespoon
Salt	1/4 teaspoon

Two egg yolks

Have all ingredients cold. Beat egg thoroughly. Add 2 tablespoons of oil slowly, drop by drop, beating constantly. Then add 1 teaspoon at a time until the mixture thickens. When very thick add 1/2 tablespoon vinegar. Add the remaining oil more rapidly, beating all the while. Finally add the salt, paprika and the tablespoon of vinegar. Place the mayonnaise in a jar and keep in a cool place.

Ice Cream

Cream, 40%	50 gms. or 1/4 cup
Egg, 1/2	25 gms.
Water	1/2 tablespoon
Saccharin	1/4 grain
Vanilla	

Method: Beat egg until very light, add saccharin which has been dissolved in water. Fold in whipped cream, add vanilla. Freeze.

Egg-nog

Cream, 40%	1/2 cup
Water	1/4 to 1/2 cup to thin cream
Egg	1
Saccharin	1/2 grain
Vanilla	Few drops

Cocoa

Cocoa	1/2 teaspoon
Cream, 40%	1/2 cup
Water	1/2 cup

Saccharin—1/2 grain may be added if desired.

INSTRUCTIONS TO THE PATIENT

1. Satisfactory results cannot be obtained unless this diet is followed absolutely as outlined. Even the smallest deviations from this will ruin the chance for success of this treatment.
2. No food or beverage other than that listed is to be taken.
3. Water may be taken in moderate quantities as desired.
4. The chewing of gum or tobacco is not permitted. Smoking is allowed.
5. No cathartics are to be used other than mineral oil or *bitter* cascara.
6. Do not take any medicine unless prescribed by the physician. It may conflict with the diet.
7. Do not use tooth paste.
8. Stay on the diet 10 to 12 days. The last 8 to 10 days, take 12 pills* daily.

*The pills referred to are ammonium nitrate or ammonium chloride, 0.5 gm. each.

Summary

Of 161 patients with bacillary infections who replied to questionnaires and who had been treated by means of the ketogenic diet on the average of two years previously, 26 per cent suffered recurrences. There was little difference in the incidence of recurrence of the various bacilli.

In the majority of cases recurrences were mild and occurred within the first three months.

A ketogenic diet suitable for use in the home is outlined.

Conclusion

The ketogenic diet is a successful method of treatment, not only in regard to the immediate, but also the end-results.

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MEDICAL QUESTION COURT*

W. A. O'Brien, M.D., Presiding

THE following questions were submitted by members of the Minnesota State Medical Association prior to the annual meeting and were given to the physicians and surgeons who made reply forty-eight hours in advance of the meeting. The answers here published were given as a part of the regular program of the convention.

How does one treat nail biting in small children?

DR. H. F. HELMHOLZ, Rochester, Minnesota: The treatment of nail biting in children is not a simple thing. The matter of restraint, mechanical devices of various kinds, and threats usually are not of any great value.

It is important to call the attention of the child to the fact that he is biting his nails, without irritating him. A simple method I have used with one of my children was to call him by a different name than I usually called him when I wanted to call his attention to the fact that he was biting his nails. It worked very well, and I have given it to other people. The youngsters do not know they are biting their nails, and if you can call their attention to the fact without saying, "Shop biting your nails," which will irritate them, you will help them and not lose their cooperation. Appeal to their pride. Tell them that it is something they can get over and will get over if they will just watch themselves.

Then there is the matter of release of tension, which is unquestionably an important factor. They do it at times when they are under tension, when they are excited, when they are receiving a reprimand, when they are going to exciting movies, or under any strain. That must be taken care of in the best possible way, and, in the same way, see that they are getting plenty of rest.

Locally, it is well to avoid all irritation, hang nails, to see that the cuticle is kept down as much as possible, and inasmuch as most of these children are girls it would be well to give them a manicure set so that they can keep their nails in the best possible condition. Encourage them and help them as much as possible in overcoming this tension.

What are the indications for the use of the extract of the whole adrenal gland?

DR. D. L. WILBUR, Rochester, Minnesota: The suprarenal gland contains three substances that are particularly valuable so far as physiologic processes are concerned. These are: cortin; ascorbic acid, or vitamin C; and adrenin.

Most extracts of the suprarenal gland do not contain sufficient quantities of cortin, if they contain any of it, to be physiologically significant.

Cortin has been used in recent years in the treatment of Addison's disease. Studies on the metabolism of sodium and potassium in cases of Addison's disease have indicated that in many such cases cortin is not an essential part of treatment. It seems apparent that cortin will be of value principally in cases in which patients are in the crisis of Addison's disease, in cases in which surgical shock develops following operations on the suprarenal gland, and possibly in cases of severe infection or toxemia.

Please describe the treatment of trigeminal neuralgia.

DR. A. W. ADSON, Rochester, Minnesota: Before answering the question perhaps it might be well to define the term "trifacial neuralgia." Trifacial neuralgia is frequently described as tic douloureux. This disease is a distinct entity and occurs in middle life or later. It is characterized by sharp, lancinating, stabbing pains that occur in paroxysms and involve one or more branches of the trigeminal nerve.

The treatment of the disease consists either in palliative relief or permanent relief by injecting alcohol into the involved branch or sectioning the sensory root. The alcohol produces a most effective result when it is injected into the nerve as the individual branches leave the foramina of the skull. Seven out of ten injections are successful and the average time of relief from the paroxysms of pain is about eighteen months. The injection may be repeated as the pain returns but eventually scar tissue forms which prevents subsequent successful injections. Therefore, one to three injections are employed before advising and performing the radical operation of section of the sensory root. The injection of alcohol is indicated chiefly when there is but one branch involved and when there is some doubt as to whether or not the facial pains are the result of trigeminal neuralgia. A successful alcohol injection with the resulting anesthesia always offers temporary relief from the pain when it is the result of trigeminal neuralgia but rarely offers any relief when the pain is due to other causes than trigeminal neuralgia.

Permanent relief is obtained by the radical operation which consists of a total or subtotal section of the sensory root. The sensory root which is situated posterior to the ganglions may either be exposed through a transtemporal approach or a suboccipital approach. Most of the neurosurgeons, as well as I, prefer to employ the transtemporal approach. This exposure allows one to do a subtotal section if the disease is limited to the third branch or a total section if more than the third branch of the trigeminal nerve is involved.

When is a patient cured of syphilis?

DR. PAUL A. O'LEARY, Rochester, Minnesota: At the Dermatological Congress in Budapest last fall there was a symposium on the cure of syphilis. It was universally agreed by all the participating speakers that acute syphilis is curable. In all the other manifestations of syphilis, however, the use of the word "cure" is not applicable because in these patients the word "arrest" is as near as we can come in saying that the patient has been rid of the disease.

The criteria of the cure of syphilis may be summarized briefly as follows: In a patient who started treatment during the early phase of syphilis and who received an adequate amount of treatment, if the blood Wassermann and a spinal fluid findings remain negative and a general examination shows no evidence of cardiovascular disease or other signs of syphilis, and if the examination and tests remain negative for three years, we can then classify this patient as cured. Each year thereafter that the serology and the clinical signs remain negative, the probability of cure increases. A small percentage of the patients who acquire syphilis cure themselves spontaneously. It is because of this inherent ability that certain patients have been cured of syphilis with only a few injections of arsphenamine. As we have no way of determining beforehand the patients who have a sufficient resistance to the disease from those who are lacking in the defensive mechanism, it

*Held at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 6, 1936.

is imperative that all patients with early syphilis undergo adequate treatment.

What is the value of curettage in dysmenorrhea?

DR. J. C. MASSON, Rochester, Minnesota: In spite of the fact that many authorities in gynecology condemn the use of the curette in the treatment of dysmenorrhea, the fact remains that a large per cent of women are helped by a dilatation, and we must include dilatation with the use of the curette in any of these cases. The use of the curette without dilatation is a real danger because of injury to the endocervix and the possibility of stenosis afterwards. The use of the curette and dilatation, while it does not cure in many cases, gives a higher percentage of relief to these patients than any other method.

In women who are more or less incapacitated for one, two or more days at each monthly period, we must keep in mind that if nothing is done to help them they are very apt to become neurotic and incapacitated to such an extent that they are not able to hold a job. If the curette will help them for two or three months at a time, I feel that it is advisable even if it has to be repeated. In cases of acquired dysmenorrhea due to a submucous polyp or fibroid or even when it is due to hypertrophy of the endometrium, especially of the polypoid type, a thorough dilatation and curettage is often of definite help. While we must condemn the indiscriminate use of the curette, and feel there is great danger done to the pelvic organs by its unnecessary and unscientific use, we have to keep in mind that it is one method of helping these patients.

In cases with severe dysmenorrhea, the operation of cutting the presacral nerve probably holds out the best hope of permanent cure, but, of course, is a major operation.

Is detachment of the retina ever cured?

DR. W. L. BENEDICT, Rochester, Minnesota: Spontaneous recovery is the rule in retinal detachment accompanying retinitis of pregnancy. Detachment from other causes is curable by surgery in from 45 to 90 per cent of the cases. Recent improvements in methods of diathermy have made it possible to repair tears in the retina about the posterior segment of the eyeball, accounting for the marked increase in cases cured. The most satisfactory results are obtained in cases of recent detachment. After several months of detachment, the retina becomes atrophic and function may not be resumed even though the retina is entirely replaced. In cases of complete detachment of the retina, it is not always possible to secure a satisfactory reattachment, but if operated before atrophy ensues, a portion of the retina may become reattached so that partial visual function can be resumed.

One of my patients has heard that leukoplakia may turn to cancer. How can this be prevented?

DR. F. A. FIGI, Rochester, Minnesota: There are three distinct types of leukoplakia, ordinary squamous, papillary and syphilitic. All of these occur much more commonly in men than in women.

The squamous type, which is that most commonly seen, most often results from excessive use of tobacco, although it may develop following chronic irritation from any other source. Ordinarily, it is of no particular significance unless it becomes definitely thickened and leathery. Then these thickened areas are prone to develop malignant change at their base, and removal is accordingly advisable.

The papillary or warty type of leukoplakia is comparatively rare. This type of lesion is potentially malignant. It is very prone to develop into the so-

called frozen-door, mat type of squamous-cell epithelioma, and should always be removed regardless of its situation or the length of time it has been present.

The syphilitic type, occurring most commonly just inside the angles of the mouth and over the dorsum of the tongue, is very prone to develop malignant change in any areas of thickening and should accordingly be removed promptly.

The best means of dealing with leukoplakia is either wiping it off with the actual cautery, using electrocoagulation lightly, or excising the affected region. Personally, I prefer to excise these areas and then suture, approximating the margins carefully with fine catgut or silk so that a minimum of scarring remains.

I have difficulty in interpreting films of my tuberculin positive adult patients. Where can I get a book which will help me be certain of my diagnosis?

DR. J. D. CAMP, Rochester, Minnesota: To the general physician who is interested in learning more about roentgenology of the chest, I can recommend two books, one by Wessler and Jaches, published by the Southworth Company, Troy, New York, in 1923, and the other by Sante, which was published by Hoeber, Inc., of New York in 1930.

The interpretation of roentgenograms of the chest is one of the most difficult phases of roentgenology and cannot be practiced by a combination of textbooks and an x-ray machine. It requires considerable experience and study and the careful application of the principles which are fundamental to all roentgenologic interpretation.

One of my patients was found after x-ray diagnosis to have osteoarthritis of the lumbar spine. What is the treatment?

DR. HENRY W. MEYERDING, Rochester, Minnesota: The treatment of osteoarthritis of the lumbar vertebrae depends somewhat on the age of the patient and on the symptoms. If there is a localized involvement following injury, the condition may be the result of injury of bone and hemorrhage, in which case a period of rest in a recumbent position would be indicated; later, a spinal support is advisable. When the arthritis has become more marked, the limitation of motion of the spinal column and limitation of expansion of the thorax, braces should be applied to prevent flexion deformity. The removal of foci of infection in the teeth, tonsils, and prostate, combined with baking and massage of the back afford considerable relief. In instances in which pain persists and is localized, as in the lumbosacral joint, and all forms of conservative measures fail to give relief, fusion or arthrodesis may be indicated.

I have recently heard of the x-ray diagnosis of placenta previa. I am not familiar with the technic or its value.

DR. R. D. MUSSEY, Rochester, Minnesota: A couple of years ago, Urner described a technic in the diagnosis of placenta previa.

As you know, during the third trimester of pregnancy, the presenting part will be in contact with the bladder unless there is some pelvic disproportion. Urner determined that if a solution opaque to the x-ray was injected into the bladder, the presenting part could be shown by x-ray to be resting on the bladder. Urner used sodium iodid in his work. We have been using 20 to 30 c.c. of 5 per cent solution of silver iodid mixed with an equal amount of an emulsion of olive oil.

When a woman has placenta previa and there is no disproportion between the fetal head and the pelvic inlet, the presence of the placenta prevents the head from resting down on the bladder; in such an in-

stance, following injection of this solution into the bladder, the x-ray shows that the fetal head does not rest on the bladder. It is important to have the bowel empty when the picture is taken. We have used it in several instances and have found it to be of assistance in making the diagnosis of placenta previa.

What is the best treatment for an ordinary uncomplicated case of acute pyelitis in children?

DR. H. F. HELMHOLZ, Rochester, Minnesota: I think there can be no question that the most important point in the treatment of acute pyelitis is ample diuresis. In childhood simple pyelitis is a disease that runs a favorable course whether treatment is given or not. Unquestionably, a great many cases of pyelitis are never recognized. Give plenty of fluids to the patient so that you are constantly washing out the urinary passage and, in addition, administer alkalis, sodium bicarbonate and sodium citrate equal parts, up to alkalization of the urine.

Most simple cases yield to this therapy, and it is surprising to see, where cultures are taken and the number of organisms determined in the urine, how small a number of organisms you may have with still large amounts of pus in the urine.

If, after a short period of time, the infection persists, I think the newly introduced mandelic acid given with ammonium chloride will very rapidly clear up the infection.

We have recently treated a number of patients whose urine has been sterilized within forty-eight hours.

Sharply to be separated from these cases of simple pyelitis is the group in which there is some obstruction in the urinary passages. It is extremely difficult to clear up the infection in this group.

In patients not showing allergic symptoms elsewhere, how does one make a diagnosis of gastro-intestinal allergy?

DR. D. L. WILBUR, Rochester, Minnesota: The diagnosis under such circumstances is usually difficult. There are several methods of approach in making the diagnosis. The history may reveal a family incidence of allergic disease; there may be episodes of abdominal symptoms, most of which are referable to the colon. These episodes occur at intervals and often during certain seasons of the year. Such patients are frequently not neurotic and between attacks are free of symptoms. The presence of eosinophilia may lead to the suspicion of such a condition. Specific methods of diagnosis include skin tests, the keeping of a diary, and use of an elimination diet. Skin tests are probably not of much value but the latter two methods are frequently helpful. If symptoms clear up when the patient is taking an elimination diet, one should not immediately jump to the conclusion that the gastro-intestinal symptoms are the result of an allergic disturbance.

Is operation the only cure for Raynaud's disease?

DR. A. W. ADSON, Rochester, Minnesota: The answer is in the affirmative. However, if the symptoms are mild in character it is possible to ameliorate them by medical measures. This is accomplished by controlling the nervous phenomena which these patients so frequently exhibit, in addition to the avoidance of exposing the fingers and toes to cold temperatures.

The operation which has proved to be so effective in the relief of Raynaud's symptoms consists of an extensive sympathectomy. If the disease involves the fingers, a bilateral cervical thoracic sympathectomy is performed. When the disease involves the toes, a bilateral lumbar sympathectomy is performed. Regard-

less of the particular type of operation to be employed, it is extremely important to include in the resection all of the sympathetic fibers carrying vasoconstrictor impulse to the affected extremities.

Is it possible to desensitize a patient who is susceptible to poison ivy?

DR. PAUL A. O'LEARY, Rochester, Minnesota: Experiences differ greatly in the evaluation of desensitization to the Rhus toxicodendron. It is possible that the differences in the reported experiences are due to the fact that the local plant was not used in the preparation of the extract employed for the desensitizing. In other words, a poison ivy extract from a plant which is gathered in New York state is probably not of great value in desensitizing the individual here in Minnesota.

The reports indicate that the efforts of desensitizing by administration of the extract by mouth have been of little value. It is possible that some of the good results obtained by the injection method of desensitizing have been derived not so much from the injection of the Rhus toxicodendron antigen as from the fact that these patients eventually learn that if gasoline or kitchen soap, or some other alkali, is applied to the skin immediately after exposure to the poison ivy, they can prevent attacks. It is also likely that these patients undergo a desensitization to the Rhus as a result of contact. Accordingly, it is difficult to appraise the value of the poison ivy extracts because of the numerous factors which must be considered beside desensitization.

Do you recommend x-ray treatment for non-bleeding fibroids of the uterus?

DR. J. C. MASSON, Rochester, Minnesota: I can answer that question by one word—"No." I do not think there is any indication for x-ray or radium in fibroids unless associated with bleeding. If the tumor is large enough to give symptoms from pressure, or be an inconvenience to the patient, it could be reduced in size by x-ray, but I am satisfied that a more practical and better method, with very little risk, would be a subtotal or if advisable, a total hysterectomy.

I personally look upon the use of irradiation in benign tumors of the uterus as only indicated in cases of menorrhagia, at or close to the menopause.

Is it possible for a hyperopic child to pass a successful Snellen's School Chart test? If so, how does one detect these children in school work?

DR. W. L. BENEDICT, Rochester, Minnesota: The normal eye of a child is hyperopic. It may vary from one diopter to several diopeters and still allow the child to pass the Snellen test. A child may carry up to five or six diopeters of hyperopia without symptoms. A child who is asthenic or with a naturally weak ciliary muscle may complain of headaches, eye strain, blurred vision, with much less hyperopia than another who has no symptoms whatever. Unless there are symptoms of headache, eye strain, blurring of vision, a tendency to diplopia, or even to cross-eyes, one may not detect this hyperopia by any test that could be given to a school child. Furthermore, so long as a child carries a normal amount of visual acuity without symptoms, it is immaterial whether the hyperopia be corrected or not. It is impossible to tell by the Snellen Chart the character of the refractive error.

Whenever a child complains of his eyes, he should be sent to an eye physician. It is only possible to determine the amount of hyperopia by as nearly complete relaxation of the ciliary muscle as it is possible to obtain by the use of mydriatics. It is impossible to expect any mechanical device or any set of fogging

lenses, such as may be applied in the investigation by a non-medical person, to uncover the amount of hyperopia the child may have. However, it is only necessary to submit a child to these severe tests in case his symptoms are wearisome or persist.

Is it possible to have a salivary calculus without being able to show stone in the x-ray?

DR. F. A. FIGI, Rochester, Minnesota: More than nine out of ten salivary calculi occur in connection with the submaxillary salivary glands and ducts. Only a very small percentage of salivary stones form in the parotid gland or ducts. Often these stones do not show up in the roentgenograms for the simple reason that such roentgenograms are improperly taken, the mandible being superimposed over the salivary structures. If roentgenograms are taken by placing one of the larger dental films in the floor of the mouth and directing the rays through from below, these stones will show in practically 99 per cent of cases, if not more.

Will you please give me some practical pointers on getting better sinus x-rays? I do not seem to get enough contrast to be certain of my results.

DR. J. D. CAMP, Rochester, Minnesota: A fundamental requirement for successful roentgenography of the sinuses is good detail and generally if we correct the factors which influence detail, we will go a long way toward improving our results. Good detail is dependent on: (a) Adequate immobilization of the patient; (b) A fine focus tube—not over 3 mm. focal spot; (c) Good intensifying screens; and (d) Adequate film target distance—not less than 30 inches.

Frequently sinus roentgenograms fail to reveal the maximum amount of information obtainable by this method because the position best suited for the sinus under investigation has not been used. There are several standard positions for this work which are described in most text books concerning x-ray technic.

Routinely, it is not necessary or even desirable to have a great deal of contrast in sinus films, and the majority of radiologists do not recommend the use of a Potter Bucky diaphragm for this examination. Too much contrast will obscure the shadows of thickened or edematous mucous membrane which occurs in a great majority of these cases.

What do you think of local anesthesia in treatment of fractures?

DR. HENRY W. MEYERDING, Rochester, Minnesota: I believe the use of local anesthesia depends considerably on the environment in which the individual works. In an institution where there are always anesthetists who are capable of giving careful scientific general anesthesia of varying types, spinal and general anesthesia are usually employed more often than local anesthesia.

As regards infiltration at the site of a recent fracture with novocain. This method, however, gives one an opportunity to aspirate hematomas. I believe there arises the possibility of infection by the introduction of a foreign substance. Good anesthesia and moderate relaxation may be obtained, but in many of the cases encountered one is dealing with old ununited fractures, malunions, and so forth, where local anesthesia is not used. However, regional or spinal anesthesia offer a great boon. When one is dealing with an old ununited fracture of the hip, spinal anesthesia permits one to apply a considerable amount of surgical treatment, without the added danger that might come from extensive operation plus a prolonged general anesthesia.

I believe in the conservative treatment of eclampsia. At a recent hospital staff meeting, one of our members stressed the radical form of treatment. Which one of us is right?

DR. R. D. MASSEY, Rochester, Minnesota: I agree with the doctor who brings up the question in regard to the conservative treatment of eclampsia. The pendulum has swung back and forth in this country for a matter of thirty years, and is now swinging more toward the conservative side.

During the White House Conference, a country-wide investigation was made, and it was found that the death rate from cesarean section after eclampsia was somewhere between 10 per cent and 20 per cent. The various statistical reports have shown that the conservative treatment of eclampsia has reduced the mortality to between 5 per cent and 10 per cent.

I firmly believe that before any method is undertaken for emptying the uterus the patient should be brought under conservative management, until such time as the convulsions have stopped and elimination is started.

In spite of cod liver oil, a recent baby patient of mine developed rickets. How does one explain this?

DR. H. F. HELMHOLZ, Rochester, Minnesota: I should like to ask on what basis the diagnosis of rickets was made, whether it was made on the diagnosis of a cranio-tabes, slight beading of the ribs, or whether it was actually made on the x-ray findings of the epiphyses and values of calcium and phosphorus in the blood.

We do know that when youngsters grow very rapidly, a breast-fed baby may develop extreme degrees of cranio-tabes so that there is the parchment-like feel to the back of the head. This, however, is not rickets.

On the other hand, he may have received cod liver oil that had been on the shelf for a long time or never had any vitamin content. Again, in a very rapidly growing child the usually adequate amounts of vitamin D may not have been sufficient to prevent mild rachitic change.

It may be that the child had some sort of gastrointestinal disturbance. Probably the most common is the celiac disease in which there is an improper absorption of the vitamin D.

What are the results of nonsurgical treatment of gallbladder disease with or without stones?

DR. D. L. WILBUR, Rochester, Minnesota: Surprisingly little is known about the results of nonsurgical treatment of disease of the gallbladder either with or without stone, despite the fact that disease of the gallbladder is the most common organic disease of the gastrointestinal tract.

One might consider this question from two aspects: first, the dyspepsia associated with gallbladder disease, and second, the results of treatment of colic. So far as the cholecystic dyspepsia is concerned, a large variety of types of medical treatment have been advocated, and if one reads the literature on this subject one receives variable impressions, because some workers have found the results are good, and others have found that they are poor.

It is fairly well accepted that a bland type of diet which contains a relatively small amount of fat and cholesterol and in which attention is given to correction of constipation has given good results in relieving many patients of the dyspepsia of cholecystic disease. The use of drugs, particularly cholegogues, such as bile salts, magnesium sulphate, and sodium phosphate, has frequently given symptomatic relief.

In general, the results of nonsurgical treatment of disease of the gallbladder, either with or without stones, are highly unsatisfactory. If disease of the

gallbladder is present, or if stones are present, the most satisfactory form of treatment of symptoms is surgical.

Are there any brain tumors that are radiosensitive enough to be successfully treated without operation?

DR. A. W. ADSON, Rochester, Minnesota: I doubt if there are any brain tumors that are actually destroyed by irradiation, but the vascular tumors are sufficiently radiosensitive to justify irradiation. Irradiation is frequently effective in producing vascular impairment in and about the tumor to such an extent as to cause the neoplasm to shrink in size and thus produce a marked relief in the symptoms which result from the increase in the intracranial pressure. Irradiation is most effective when employed subsequent to cranial exploration where one has been able to verify the extent and the pathologic nature of the inoperable tumor. Occasionally, one is justified in advising irradiation in cases in which tumors involve the brain stem and the basal nuclei, without exploratory craniotomy. The bilaterality of the symptoms and nuclear involvement are the clinical manifestations for such a procedure. Irradiation with roentgen rays or radium is occasionally indicated when recurrent symptoms develop, but the treatment should not be used promiscuously or repeatedly when definite relief is not obtained.

How does one make a diagnosis of cosmetic dermatitis?

DR. PAUL A. O'LEARY, Rochester, Minnesota: Cosmetic dermatitis is not confined solely to women who apply rouge, lip stick and powder to their faces. It may be observed on all parts of the body; for example, on the scalp from dandruff "cures," in the axillae from deodorizing agents, and on the feet in individuals who have been endeavoring to overcome a bromidrosis.

The diagnosis of cosmetic dermatitis offers some very intriguing diagnostic problems because the recognition of the cause of such a dermatitis is found by process of elimination. It is a problem of detection and presents an ideal occasion on which to use the patch test as a means of demonstrating the cause of the dermatitis. In an individual suspected of being sensitive to a cosmetic preparation, apply the product to the skin under adhesive tape, leave it there for forty-eight hours or thereabouts, and then read the reaction. If the test is positive, a patch of dermatitis will have been produced. The difficulty in this type of investigative procedure is to know the ingredients in the cosmetic. For example, more recently, since orris root has been discontinued as the basis for so many powders, the manufacturers are now using an earthen substance known as tremolite, and many people continue to have an irritative dermatitis from the spicules or needles contained in the tremolite. Rice and wheat may be the basis for powder, and many individuals are sensitive to these, manifested either in a dermatitis or asthma or hay fever-like attacks. Hence the need for knowing the ingredients in the cosmetic.

Many perfumes and toilet waters contain oil of bergamot, especially the more expensive perfumes. The oil of bergamot is a light sensitizer, and when patients apply such a perfume to the skin and expose themselves to the sun, a burn is produced at the site of application. The dye in rouge and lipstick, especially carmine, will irritate some skins. The majority of manufacturers endeavor to produce products that do not produce dermatitis, for quite obvious reasons. There is no method of desensitization which can be used in persons found to be susceptible to the various ingredients in cosmetics, and to avoid further difficulty it is essential that they discontinue the use of the irritating preparation.

I have a patient with endometriosis of the rectovaginal septum. Do you recommend radium or surgery? The mass is about the size of an English walnut and is very painful when she menstruates.

DR. J. C. MASSON, Rochester, Minnesota: The term "endometriosis of the rectovaginal septum" is another name for the well recognized condition of adenomyoma of the rectovaginal septum. The treatment of this condition is one of the real problems in gynecology. The etiology is not entirely settled and the probability is that many of the tumors which are included under this name have an entirely different origin. If a patient has a tumor in the rectovaginal septum and no other indications of endometriosis and it is possible to remove it either through the vagina or through the abdomen without opening into the rectum, this is advisable but if it is necessary to resect the large bowel to accomplish complete removal, in the majority of cases, except in very young women, it would be advisable to remove both ovaries as this will prevent any further growth of the adenomyoma.

Radium locally has very little, if any, effect on an adenomyoma. Any good accomplished by the use of irradiation is due to its effect on the ovaries and not on the local growth. In the great majority of cases in which there is extensive involvement of the rectovaginal septum, there are other endometrial growths or implants scattered throughout the pelvis, necessitating more radical surgery. If a woman is close to the menopause, castration with radium or x-ray is quite justifiable unless large tumors, especially chocolate cysts of the ovary, are present.

How reliable are the retinal changes in the diagnosis of malignant hypertension?

DR. W. L. BENEDICT, Rochester, Minnesota: Retinal signs of malignant hypertension are progressive narrowing of the retinal arteries with resulting edema of the retina and the choroid and swelling of the optic disk.

To those who are perfectly familiar with changes of the fundus as revealed by the ophthalmoscope, there is very little difficulty in judging the extent of these changes, so they become thoroughly reliable indices of malignant hypertension. In its gross picture, the retinitis of hypertension is similar to that of choked disk with secondary changes, particularly if it occurs in people who have a moderate degree of arteriosclerosis. The picture is complicated by inadequate renal function with edema of the retina, hemorrhages, and exudates. It is only when swelling of the disk occurs in the later stages that one can be sure he is dealing with malignant hypertension.

With physical findings and a history of long continued or very rapidly progressive hypertension, the retinal diagnosis is most reliable.

What practical suggestions have you to offer in making an early diagnosis of carcinoma of the stomach? I have recently had two patients whom I called negative and later on both were found to have carcinoma.

DR. J. D. CAMP, Rochester, Minnesota: The early roentgenologic diagnosis of any lesion of the stomach presupposes a thorough familiarity with the normal. In the hands of the average physician, a careful fluoroscopic examination plus several films in various positions will give the most reliable results. The eyes should be fully accommodated before fluoroscopy is attempted. All patients' stomachs should be empty and a barium meal of good homogeneous density should be used. The gastric mucosa is best observed by the use of small

amounts of barium carefully manipulated about the stomach by the palpating hand.

In my experience, the most valuable sign of ulcerating carcinoma is the "meniscus" sign, described by Carman. The "meniscus," which represents the crater of the growth, varies in size with the lesion, but its characteristic roentgenoscopic appearance has allowed the recognition of carcinomas as small as 1.5 cm. in diameter. Polypoid lesions, particularly discrete polypi, regardless of their size, may exhibit microscopic evidence of malignancy, hence this possibility should be borne in mind in spite of the fact that the roentgenologic evidence grossly indicates a benign lesion. Not infrequently small lesions will be missed because the stomach is filled with too much of the barium meal, which interferes with proper palpation and visualization of the gastric mucosa. The recumbent position must be used for the examination of the cardia.

Are the ordinary arch supports sold in shoe stores of any value in the treatment of flat foot?

DR. HENRY W. MEYERDING, Rochester, Minnesota: Many people wear arch supports who do not need them. It is not a question where they are sold, but whether they are needed and well fitted.

The usual condition found is a weak foot, not a flat foot. The condition is the result of nonuse, sedentary life, overweight, and probably is aggravated by improper shoes. The way to correct this type of foot is by exercise, the avoidance of stress and strain, which occurs among shop girls who stand on their feet for a long time and among men who stand at ease for long periods of time. Tendons and ligaments become stretched. The muscles are weak, do not have good tone and become relaxed. The bones are unable to support the weight of the body normally and become displaced.

These patients do not require arch supports. What they require is a system of graduated exercise that will build up those muscles which tend to give support. This will allow them to walk in comfortable well fitted shoes.

The promiscuous use of arch supports, sold without proper supervision, is to be condemned.

In an operation for ectopic pregnancy I recently encountered a large amount of blood in the peritoneal cavity. I emptied out the blood and gave the patient a transfusion. I have since been informed that I could have used this blood for transfusion. Is this advisable?

DR. R. D. MUSSEY, Rochester, Minnesota: The doctor who asked this question is quite right in using the blood from a donor for transfusion, although it is possible to use blood from the peritoneal cavity or from the chest cavity. As you know, recently in Pittsburgh, according to the news headlines, blood from the chest cavity was used in a case of puncture wound of the heart. As a rule, however, it is better to use a matched donor if the matched donor can be obtained at the time that the blood is needed. However, in an emergency, one may use other solutions for transfusion. One that has been of distinct value to us in emergencies is a 6 per cent gum acacia in double distilled water. Its value rests particularly in the fact that it remains in the vessels longer than either saline or glucose and maintains a volume of blood until such time as a donor can be obtained, if a blood transfusion later becomes necessary.

If the blood in the abdominal cavity is used, one has to be sure that it is all carefully filtered. Unless one meets with such an emergency that no other fluid is available, ordinarily it would be better to resort to other solutions than using intra-abdominal blood.

The Volta Bureau

"We consulted several specialists, and all of them confirmed our fears, but none offered any solution of our problem." Thus the mother of a small deaf child wrote to the Volta Bureau. The sentence might be quoted verbatim from many letters written by parents of deaf or hard of hearing children, or by hard of hearing adults.

The knowledge that deafness is present and that it is incurable comes with the force of a major calamity. It is so crushing in its effect that something positive in the way of help must be offered immediately, if the individual is not to spend desperate years in a bewildered effort to adjust himself. The parents of a deaf child must be told that the child can be taught to speak and can be successfully educated, and that this education may be begun at home immediately, even if the child is not more than two years old. The parents of a child whose hearing is only slightly impaired must be given advice as to his adjustment. The hard of hearing adult must be told about lip reading, about hearing aids, about social efforts in his behalf.

The Volta Bureau was established for the purpose of furnishing all this information to all who ask for it. Its services are free. Alexander Graham Bell, the son of a hard of hearing mother, the husband of a deaf wife, the lifelong friend of everyone handicapped by deafness, used the money received as a prize for inventing the telephone to found the Volta Bureau so that anyone confronting the problems of deafness might be assured of help. Advice is given as to schools and preschool training, lip reading instruction, hearing aids, social contacts, psychological difficulties. While the Volta Bureau is not equipped to do employment service, it gives information in regard to the fields of activity that are open to the deaf and the hard of hearing.

The Volta Review, a magazine for parents and teachers of the deaf and for the hard of hearing, is on the reading table of many physicians. Pamphlets dealing with all phases of deafness except medical problems are available to all who ask for them. Lists of such pamphlets and sample copies of the magazine will gladly be sent free of charge. The Volta Bureau is located at 1537 35th St., N.W., Washington, D. C.

CLINICAL PATHOLOGICAL SEMINAR*

Conducted by E. T. BELL, M.D.

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Minneapolis

Chronic Lipoid Nephrosis of Mixed Type

Case 21.—The case is that of a man, sixty-four years old, a newspaper linotype operator, who was admitted to hospital January 2, 1936, complaining that he had injured the right upper arm the day before; he did not know how it happened. His physician had found him in a convulsive state and sent him to the hospital. The patient had had "heart and kidney trouble" for the preceding ten years.

The temperature on admission was 98.6°, pulse 80, respirations 18 and blood pressure 90/60. He was slightly disoriented. In the bases of both lungs there were a few scattered crepitant and bubbling râles. There was a fracture of the right arm 10 cm. above the elbow with lateral displacement of tissues. Examination otherwise essentially negative. The impression from the x-ray plates was fracture of the distal third of the shaft of the right humerus, questionably pathologic. The urine showed albumin +++; specific gravity 1016; no pus cells; no red blood cells. Blood: hemoglobin 70 per cent; leukocytes 32,750. Wassermann and Kahn tests were not done.

On the day of admission a Kirschner wire was inserted through the olecranon process of the right ulna. He got along well until the third day following admission when at 7 a. m. he suddenly became cyanotic and his respirations became labored. He became stuporous and comatose and died at 9 a. m. the same day.

After the autopsy it was found that for about ten years the patient had been studied in various institutions with special regard to kidney disease. In June, 1926, during a period of four weeks he had severe generalized anasarca. He was treated by paracentesis, thoracentesis, skin punctures and special diets whereby the excessive body fluids were greatly reduced. The urine at this time contained 7.6 gm. of protein per twenty-four-hour specimen and many casts. The non-protein nitrogen was 35 mg. In the previous history there was no sore throat nor any febrile or infectious illness preceding the edema.

On April 29, 1927, he was admitted to hospital because of edema and albuminuria. He complained that for a time he had suffered from diplopia. The blood pressure on admission was 172/112; this was shortly checked and found to be 146/104. During the rest of the stay in hospital the blood pressure was never over 145 systolic, usually between 110 and 130. The eye-grounds were normal. X-ray of the heart showed normal size and contour; x-ray of the chest showed evidence of fibroid tuberculosis in the right upper lobe. The urine contained constantly 2 to 6 gm., of albumin per twenty-four-hour specimen. Daily specimens were almost constantly recorded as +++ to ++++ albumin; there were many casts; white cells were frequently found and usually a few red blood cells; the specific gravity ranged around 1021. Blood: hemoglobin 65 per cent; red cells 3,600,000; leukocytes 12,000 to 15,000. The P. S. P. varied between 23 per cent and 34 per cent in two hours. The blood urea nitrogen was between 22 and 26 mg. per 100 c.c.

He was treated by the usual methods to reduce edema. Dental work was done with extractions because of pyorrhea. He was much improved and was followed thereafter at the dispensary; he first reported here in October, 1927, and his last visit was in January,

1931. During this period his blood pressure was usually about 140 systolic; one reading was 152/96. The edema greatly improved although the urine continued to show +++ to ++++ albumin. The blood urea nitrogen was 27 mg; the P. S. P. was 35 per cent.

He was next seen at the hospital where he was admitted on the medical service in March, 1934. For about three months he had been growing weaker, had lost weight and suffered from vomiting. In addition there had been sudden attacks of dyspnea. He was pale and anemic; his skin was dry and scaly. There was impaired resonance with diminished breath sounds over the right lower thorax. There was slight pitting edema of the feet and ankles. Otherwise the physical examination was essentially negative. The blood pressure was 124/85. X-ray showed a normal appearing heart shadow. The electrocardiogram was normal.

The urine constantly contained +++ to ++++ albumin; casts were always present; occasional red cells were usually found and pus cells varied between 14 and 250 per high power field. Quantitative determinations showed excretion of 0.5 gm. to 8 gm. per twenty-four hours; as a rule 2 to 5 gm. were excreted daily. Three different P. S. P. tests showed excretions of 8 per cent, 4 per cent and 9 per cent in two hours. The blood urea nitrogen varied between 22 and 30 mg. per 100 c.c. The plasma protein determination showed fibrinogen 0.51 per cent, globulin 2.52 per cent, albumin 2.09 per cent, total 5.12 per cent. In a special concentration and dilution test the specific gravity of the urine varied between 1002 and 1014. There was rather severe secondary anemia with 50 per cent hemoglobin and 2,800,000 red cells. The anemia gradually improved under treatment and at the time of discharge the hemoglobin was 70 per cent. There was almost constant leukocytosis with counts between 17,000 and 21,000.

The patient improved considerably under treatment. The edema completely left him. Albuminuria persisted. A persistent diarrhea was treated with paregoric. He was discharged on April 21, 1934, on a salt free, low protein diet. He was taking reduced iron for his anemia.

He was seen several times in the dispensary between May, 1934, and September, 1935. The blood pressure tended to be regularly more elevated with systolic levels of 130, 170, 180, 160 and 170. The urine contained ++ to ++++ albumin, occasional or two to three red blood cells, numerous pus cells and many casts. The secondary anemia continued to improve. Four blood urea nitrogen determinations during this period were 35, 42, 27 and 40 mg. per 100 c.c.

Autopsy findings: The heart weighs 260 grams; it shows no disease except some coronary sclerosis. There is chronic tuberculosis of the upper lobe of the left lung. The right kidney weighs 100 grams, the left 90 grams; the surfaces are finely granular. Microscopic section of the kidneys shows marked cortical atrophy and large numbers of hyaline glomeruli; the persistent glomeruli show marked thickening of the capillary basement membranes.

Diagnosis: Chronic lipoid nephrosis of the mixed type.

Comment.—This disease was formerly called "chronic parenchymatous nephritis." It is characterized through-

out its course by marked albuminuria and edema with only moderate hypertension. Renal insufficiency comes on later in the course of the disease. The microscopic change is thickening of the capillary basement membranes which continues until a large part of the glomerular circulation is closed. This results in atrophy of the kidneys. The majority of cases of lipid nephrosis of mixed type show larger kidneys than these at post-mortem. Occasionally the kidneys are contracted as in this instance. In pure lipid nephrosis there is no hypertension or renal insufficiency but these features are present in the mixed type.

Carcinoma of the Stomach with Meningeal Metastases

Case 22.—The case is that of a woman, fifty-eight years old, who was first seen by her physician in 1925 when she complained of gastric distress. Diagnosis was made of peptic ulcer and she was treated medically with relief. In 1934 she had tarry stools. In 1932 she had diplopia which was corrected by refraction. She was otherwise fairly well until about May 23, 1936, when she began to have projectile vomiting and vertigo. On about June 1 she was admitted to hospital with the complaint of gastric distress. While there she had headache, visual disturbances and severe pain in the scapular region which radiated to the top of the head. There was rigidity of the neck. Gastrointestinal x-ray study showed a healed peptic ulcer. She returned home after two weeks of hospital stay.

On June 19 she was admitted to another hospital; headache, vomiting and rigidity of the neck had persisted; there was no fever on admission. Neurologic examination was entirely negative except for rigidity of the neck and the absence of the plantar response on both sides. Spinal puncture on June 20 showed the fluid under pressure of 42 mm. of mercury; it was clear. The jugular pressure was normal. Cell count was 45 per cubic millimeter; the cells were very large mononuclear cells which were interpreted as endothelial cells. The pain decreased after the withdrawal of spinal fluid. No physical examination recorded.

Laboratory findings: Hemoglobin 52 per cent to 55 per cent; red blood cells 3,250,000; white cells 14,400; 80 per cent polymorphonuclears, 2.5 per cent young forms; lymphocytes 18.5 per cent; monocytes 0.5 per cent; transitional monocytes 0.5 per cent. The polymorphonuclears showed a definite shift to the right with many lobes and a few of them suggestive of pernicious anemia. There were no macrocytes. The urine was not examined. X-ray studies showed fairly extensive hypertrophic arthritis involving the lower cervical vertebrae; no evidence of fracture, dislocation or bony injury. The skull was negative. Blood pressure 120/70 to 140/78; pulse 80 to 90 until the ninth day after admission when it began to rise; respirations 20 to 30.

On June 23, three days following the spinal puncture, the patient again experienced projectile vomiting. On June 26 she complained that she was unable to see. The vomiting persisted. She was given morphin for the pain and intravenous glucose. The temperature began to rise the fifth day after admission and reached 101.6° axillary at death; the pulse rose to 140; the patient was comatose during the last few days of life. Death occurred July 2, 1936.

Postmortem: The body was well nourished; there was no edema or jaundice. The right pleural cavity was obliterated by old adhesions. The heart, lungs, spleen and liver were normal. The stomach showed a large ulcer on the posterior wall at the lesser curvature near the pylorus, measuring 4x4.5 cm.; the edges

were indurated and the crater was deep; there was a second similar ulcer close to the pylorus. The wall of the stomach underlying the ulcers was indurated. Microscopic section showed the ulcers to be scirrhous carcinoma. Both ureters were moderately dilated but no obstruction was found. The meninges appeared on gross section to be normal; no increase of subarachnoid fluid; no tumor was found in the brain on section; there was definite flattening of the convolutions. The spinal cord was removed and also appeared normal on gross examination.

Microscopic sections of the meninges of both brain and spinal cord in several places showed the subarachnoid space filled with tumor cells; the cells were rounded and free, resembled lymphocytes to some extent but all of them contained mucin and resembled the cells in the carcinoma of the stomach. There were also metastases in the lymphnodes and adrenals but these contained solid masses of carcinoma such as one ordinarily sees.

Diagnosis: Carcinoma of the stomach with widespread metastases to the subarachnoid space; also to the lymphnodes and adrenals.

Comment.—This is a rare type of metastasis from a carcinoma of the stomach but several such cases have been published. It is to be noted that the x-ray was misinterpreted as a benign ulcer. It is likely that the carcinoma had been present since 1925. Scirrhous carcinomas of long duration occur frequently. There is no convincing evidence that the original lesion was a benign ulcer which later became malignant. The irritation of the subarachnoid metastases gave the picture of meningitis. Possibly the tumor cells might have been recognized in the spinal fluid if the pathologist had had this possibility in mind.

Carcinoma of the Liver (Hepatoma)

Case 23.—The case is that of a man, sixty years old, who twenty-seven years ago had removal of left undescended testicle and herniotomy. He was first seen by his physician concerning his present illness on March 18, 1935. Six years before he had been seen by the same doctor when he had an irritable colon and infected tonsils. In the interim his weight had increased from 128 pounds to 161 pounds.

In March, 1935, his complaint was constipation for four weeks and loss of 15 pounds in weight in six months, his weight then being 146 pounds. Examination showed a hard liver edge; blood pressure 148/80; rectal examination negative; cholecystography and liver function test (bromsulphthalein) normal; sedimentation rate 19 mm. in one hour by the Cutler method; quantitative van den Bergh 0.6 unit; hemoglobin 90 per cent. Urinalysis and Kahn test negative.

On May 27 he was seen again; there had been no improvement; his weight had dropped 10 pounds, being now 136 pounds; an irregular mass was felt in the region of the gallbladder on standing. Hemoglobin was still 90 per cent; quantitative van den Bergh showed only a faint trace of bilirubin in the blood.

On July 20 he left for a two weeks' vacation in the north woods; during this time he felt much improved. His weight was now 130 pounds. On August 13 he went to a clinic where he was given a very thorough examination. They also found a firm, fairly regular, nonfixed, nonsensitive mass in the right upper quadrant; the liver edge was two fingers below the costal margin on inspiration. Cholecystography and liver function test were normal. A few small diverticula were found in the colon. The patient was seen by a surgeon who advised against operation and thought the condition

was either cirrhosis or localized enlargement of the liver caused by disease of the gallbladder.

In October he was again seen at the same clinic; no definite diagnosis could yet be made by them. He again saw his first physician who noted that the liver was more enlarged than on previous visits; seven pounds more loss of weight; sedimentation rate 23 as compared to 19 in March. Impression now was upper abdominal malignancy. Hemoglobin 85 per cent. Urinalysis still negative.

In the middle of December the patient was at a veterans' hospital where diagnosis was made of inoperable carcinoma of the stomach with metastases to the liver. His physician now advised another check on the patient and gastrointestinal x-rays were interpreted by the roentgenologist as showing no malignancy. This was in the middle of January, 1936.

On February 14 the patient was operated upon but the surgeon did not find any growth in the stomach. The liver, however, was full of tumor masses. The patient's course from that time was progressively downhill. There was no jaundice at any time. Death occurred April 7, 1936.

Postmortem examination: Marked emaciation; no jaundice; decubital ulcers over the sacrum and over the heels. The surgical incision was well healed. The peritoneal cavity contained about 100 c.c. of slightly blood-tinged fluid. The liver edge reached 2 cm. below the costal margin in the right mid-clavicular line; the liver was adherent anteriorly to the diaphragm. The heart weighed 175 grams and showed no disease. The right lung weighed 275 grams, the left 375 grams; about fifty small tumor nodules in the right lung and about twenty-five in the left; these ranged from 2 mm. to 1 cm. in diameter, were firm and of whitish color. The bronchi and pulmonary arteries were normal; no pneumonia. The spleen weighed 485 grams and showed chronic passive congestion.

The liver weighed 2700 grams. In the central part of the right lobe was a large tumor which occupied about one-third of the surface of the cross section; the tumor did not involve the gall bladder. All other parts of the liver were filled diffusely with round tumor nodules, ranging up to 4 cm. in diameter. In the hilus of the liver were two large lymphnodes filled with tumor. The bile ducts were not obstructed at any point. The stomach showed no disease. The other organs showed no significant lesions.

Microscopic examination showed the tumor to be a hepatoma (this is primary carcinoma of the liver in which the cells are differentiated to such an extent that their origin may be recognized).

Diagnosis: Primary carcinoma of the liver (hepatoma) with metastases to the lungs and regional lymphnodes.

Comment.—This is a fairly typical clinical history of primary carcinoma of the liver except that in most instances jaundice develops. The diagnosis may usually be made by the microscopic structure of the tumor. A thorough postmortem examination, excluding all primary growths outside of the liver, is very helpful in cases where the histologic picture is not convincing. It frequently happens that recognition of masses in the liver leads to a false diagnosis of carcinoma of the stomach.

Organizing Lobar Pneumonia

Case 24.—A man, aged 54, was admitted to the hospital on March 31. Two months previous to admission he had had a severe cough with moderately severe pain over his entire chest. During the two weeks previous to admission these symptoms had become much more

marked and were associated with a high fever. At the onset of the illness he coughed up large quantities of foul sputum, which gradually decreased in quantity. Weakness had increased and there was moderate loss of appetite. The past history was essentially negative.

The temperature was 104.6°, pulse 156, respirations 36; blood pressure 110/50. The patient had moderate difficulty in breathing and was quite cyanotic. The breath had a foul odor. Dullness was moderate over the lower half of the right chest. Bronchial breathing was heard over the right chest posteriorly. There was a marked friction rub anteriorly and numerous coarse râles were heard. The heart rate was so rapid that it was difficult to hear the heart tones. The left side of the chest was normal.

Urinalysis showed a trace of albumin; 6 to 8 pus cells; a few hyaline casts; many granular casts. The hemoglobin was 64 per cent and leukocytes 17,300. Examination of the sputum showed occasional pneumococci; it was negative for tubercle bacilli; occult blood and pus were present. X-ray examination of the chest revealed increased density in the middle and lower lobes of the right lung. The exact nature of the process could not be determined.

The patient complained of constant pain in his chest. He had a very severe cough but raised only a very little foul purulent sputum. Thoracentesis was done the day of admission but only 2 c.c. of thick green pus was obtained, possibly because of plugging of the needle. The patient was very restless at all times and perspired profusely. The respirations gradually became more shallow, irregular and rapid. He developed a deep cyanosis. The pulse became weak and thready. He expired on April 2, three days after admission.

Autopsy findings: Right empyema of 300 c.c. of purulent fluid; numerous fibrous adhesions in this cavity. The right lung weighed 1760 grams (five times the normal). There was complete consolidation of the entire lower lobe. Several abscesses, approximately 2 cm. in diameter, were seen on the anterior surface of the lower lobe. On section the lower lobe had a gray fleshy appearance. In it were found numerous abscesses ranging from 1 to 3 cm. in diameter. Palpation of this surface revealed areas of rubbery consistence between the soft necrotic abscess areas. The left lung weighed 550 grams; crepitation was diminished in the posterior portions of both lobes. On section the surface appeared somewhat fleshy and mottled. Large amounts of fluid and small amounts of pus could be expressed from the cut surface.

The liver was large and fatty. The kidneys were very large and cloudy.

Microscopic examination of the lungs showed lobar pneumonia in early organization with many abscesses.

Bacteriologic study: Smear of lung abscess showed Gram positive diplococci. Gram negative filaments and many fusiform bacilli. From the lung culture were isolated *Staphylococcus aureus*, *Streptococcus viridans*, fusiform bacilli and diphtheroids. Culture of the spleen was negative.

Diagnosis: (1) Organizing lobar pneumonia; (2) multiple abscesses of the lung; (3) fatty metamorphosis of the liver; (4) empyema of the thorax.

Comment.—This case illustrates one of the complications of pneumonia. From the clinical standpoint it might well have been considered a carcinoma. The exact onset of the consolidation is neither obvious nor were the symptoms typical of lobar pneumonia. When a pneumonia fails to undergo resolution and the exudate organizes, abscesses are usually present. In the long standing process with much proliferation of connective tissue the appearance of the lung has given rise to the name of carnification.

EDITORIAL

MINNESOTA MEDICINE

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J. R. BRUCE, Saint Paul

Volume 19 SEPTEMBER, 1936 Number 9

The American Board of Internal Medicine

THE announcement in the *Journal of the American Medical Association* for August 1, which appears somewhat abbreviated in this issue of MINNESOTA MEDICINE, of the final steps in the movement for certification of specialists in internal medicine is of historic significance. The Regents of the American College of Physicians at the Philadelphia session in 1935 adopted a resolution to underwrite the necessary expense and join with the Section on Practice of Medicine of the American Medical Association in the organization of this board in the United States and Canada. The work has been well and promptly done.

The membership of the board consists of five representatives from the American College of Physicians: J. C. Meakins, O. H. Perry Pepper, David P. Barr, W. S. Middleton and G. Gill

Richards; and four members representing the Section on Practice of Medicine: Reginald Fitz, Ernest E. Irons, John H. Musser and Walter L. Bierring. The character of these men and their interest in the progress of medicine in general assure wise action in the public interest.

The purpose of the board is the certification of specialists in internal medicine and the establishment of proper qualifications, together with the required examination procedure, for certification. Great significance lies in the fact that establishment of this board should now prevent the establishment of boards for the narrower fields in internal medicine. Since the first board of certification, that in the narrow field of ophthalmology, began its work in 1916, many boards have been built up to function in surgical fields, as it has seemed legitimate and practical that anatomical divisions should play some part in surgical specialization. In internal medicine, however, the need is for breadth of view and completeness of understanding of the entire body and its functions. No anatomical division or functional group of organs can be separated from the patient as a whole. It is for this reason that internal medicine, as represented in the American College of Physicians and many other national organizations, has striven to keep internal medicine and its subsidiary specialties on a broad foundation. Immediately after July 1, 1937, this board will inaugurate similar qualifications and procedures for additional certification in some of the more specialized branches of internal medicine, such as gastroenterology, cardiology, allergy, metabolic diseases and tuberculosis; but certification in the broad field of internal medicine will be required first. The operation of this plan will doubtless require the participation and coöperation of representatives from each of these narrower fields in medicine.

It is well to remember that the purpose of the board is not primarily that of certification of competence in these fields, but of certification of men qualified as specialists and consultants. This is in line with the movement that has obtained such impetus in the American Medical Association for the reestablishment and promo-

tion of the interests of the general practitioner. In the past the American Medical Association directory has indicated interest in, or limitation to, a special field solely on the announcement of the individual involved, but when boards covering all specialties have been in full operation, the announcement of specialization in the directory will depend on proper certification. This should result in better understanding by the profession and the public. This movement should, when completed, prevent the assumption of the title of specialist, at least under recognized auspices, by anyone who desires the listing. The movement for certification in internal medicine, under the fostering care of the Advisory Board of Medical Specialties and the Council of Medical Education and Hospitals of the American Medical Association, marks a long step in advance in medical organization.

S. MARX WHITE.

Inter-State Postgraduate Assembly

ARRANGEMENTS are under way for the International Medical Assembly of the Inter-State Postgraduate Medical Association of North America which will meet in Saint Paul, October 12-16, 1936, the complete program of which appears elsewhere in this issue.

This year's Assembly will be the twenty-first annual meeting of the organization, which began as a confederation of county medical societies of northern Illinois, southern Wisconsin and eastern Iowa in 1916. At its first meeting the name of the organization was changed to the Tri-State District Medical Society of Illinois, Iowa and Wisconsin. In 1919 the growth of the society was such as to warrant the substitution of the term Association instead of Society. In 1925, under the direction of Dr. W. B. Peck of Freeport, Illinois, who has been the moving spirit of the organization for twenty-one years, a tour of medical clinics in Canada, the British Isles and France was conducted for some 753 American physicians and their wives. At the meeting held in Saint Paul in 1925 the term International Assembly was first used and the proceedings of the meetings were first published. In 1930, under the presidency of Dr. William D. Haggard, the Assembly met in Minneapolis. Last year the meeting was held in Detroit, with Dr. Charles H.

Mayo as president. The largest registration was that in Detroit in 1929, when 5,800 physicians were in attendance.

In glancing over the program we see a goodly representation of Minnesotans: Drs. Litzenberg and Wangenstein of Minneapolis; Drs. Adson, Allen, Balfour, Cabot, Lundy, William H. Mayo, Walters and Wilder of Rochester; Drs. Crothers, Schlutz and Rowntree, former Minnesota residents; and Drs. Earl Bond and John Fulton, both born in Saint Paul, but having acquired medical distinction in the East. Although attendance at the Assembly and its exhibits is limited to physicians, certain provision is being made for the entertainment of the wives of physicians by the Ladies Auxiliary of the Ramsey County Medical Society, which society is acting as host at the coming meeting. The wives and friends of physicians in attendance are invited to attend the Assembly dinner on Wednesday evening.

Osler's One Volume

THE question has already arisen as to the advisability of someone's continuing the periodic revision of Osler's one volume entitled "The Principles and Practice of Medicine."

The original volume which appeared in 1892 embodying as it did the knowledge and experience of the outstanding medical man of his time was hailed with enthusiasm by members of the profession and was translated into many foreign languages, including Chinese. The eighth edition, which was the last edition that Osler had anything to do with appeared in 1920 after Osler's death and, as he had written in the preface, bore little resemblance to the first edition due to the "extraordinary growth of our knowledge, particularly in the department of the infectious diseases."

The following four revisions of the volume were gotten out by Thomas McCrae, an outstanding medical man and one who, through his association with Osler, was in a peculiar position to carry out the original purpose of the work. Strangely this twelfth and last edition dated 1935 appeared also after the author's death.

A very fair review of the twelfth edition of Osler's text appeared in the *Bulletin of the Johns*

Hopkins Hospital for June of this year. It is not surprising that praise of the last edition and of both Osler and McCrae is mixed with the expression of some difference of opinion on the treatment of certain subjects in the volume. A book review worth while would not be expected to be in full accord with every statement of the author, particularly when the subject covers such a broad field. The reviewer thinks that a volume by one outstanding man has certain advantages over one in which each subject is treated by one individual. With this we agree and the problem for the future seems to lie in finding a man with Osler's and McCrae's outstanding ability to continue the volume.

Without any doubt Osler's volume has been the most valuable single volume on medical diseases to the general practitioner, internist and also the surgeon. How often one has thought he has found something new in medicine and has sought elsewhere in vain for information on the subject only to find the sought for material in this volume of Osler. With such a mass of medical material appearing each year and so much of an ephemeral nature, it does seem as though the continuation of Osler's volume will meet with the approval of the profession at large.

Refined and Concentrated Antipneumococcic Serum Type VII-Lederle

The Council on Pharmacy and Chemistry reports that the Lederle Laboratories, Inc., presented Refined and Concentrated Antipneumococcic Serum Type VII (Lederle) for consideration by the Council. It is claimed to be useful in the treatment of pneumococcic pneumonias of this type, which is one of the twenty-nine groups of pneumococci previously considered to be group IV organisms. The identification of these individual types and the clinical use of the specific serums have been carried out under the direction of Park by his associates Cooper and Bullowa. In Bullowa's series of 1,000 cases, about 7 per cent were found to be due to type VII organisms. The firm did not submit any bibliography for the preparation. The Council agrees with Cooper that the results are encouraging, and to a lesser extent with the firm's statement that the results are suggestive of a definite therapeutic effect. It is pointed out, however, that comparative percentages based on such a small series may be entirely misleading. In view of these factors, the Council postponed consideration of this antiserum until these workers, or others, have extended the use of this agent to a larger series of cases, and authorized publication of the foregoing preliminary report.—(J. A. M. A., May 2, 1936, p. 1564.)

In Memoriam

Seymour R. Lee

1899-1936

DR. SEYMOUR R. Lee, superintendent of the Ancker Hospital, Saint Paul, since December 1, 1935, died at the hospital August 10, 1936, from complications following an appendectomy performed July 30.

Dr. Lee was born in Blooming Prairie, Minnesota, October 20, 1899. At the age of ten his family moved to Howard, South Dakota.

In 1926 Dr. Lee obtained his degree from the medical school of the University of Illinois where he was a member of the Alpha Kappa Kappa and Sigma Alpha Epsilon medical societies. He served as interne and house physician at the Ancker Hospital in 1927 and 1928 and became resident physician in charge of obstetrics from July 1928 to October 1929, when he was made assistant superintendent. In this capacity he served until 1934. In 1934 Dr. Lee was made superintendent of the Hastings State Hospital and a year later was put in charge of the Willmar State Hospital where he remained until last December.

Dr. Lee was a member of the Saint Paul Athletic Club, the American College of Hospital Administrators, a director of the Minnesota Hospital Association, and was also editor of the Association's publication "Minnesota Hospitals."

Dr. Lee married Elsie Davidson of Garder, North Dakota, who with their five year old daughter, Dorothy, survives him. His parents, the Reverend and Mrs. Neil Lee, a sister Edna Lee of Minneapolis and a brother, Rev. Elwyn Lee of Topeka, Kansas, also survive him.

Dr. Lee became superintendent of the Ancker Hospital at the age of thirty-six and was one of the youngest of the large hospital administrators in the country. His industry and ability as well as his sterling character commanded the respect of the medical staff as well as his many friends outside the profession. His youth made his early departure sadder.

Richard Olding Beard

1856-1936

DR. RICHARD Olding Beard, a resident of Minneapolis since 1882 and active in the founding of the University of Minnesota Medical School, died August 14, 1936 at the age of seventy-nine. A detailed record of his life will appear in the October number of MINNESOTA MEDICINE.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.
L. H. Rutledge, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.
A. N. Collins, M. D.

Your Standing Orders

Now is the time to consult your State Representative and your Senator. Ask him what his views are on all of the problems that concern Organized Medicine and the Public Health in Minnesota today.

THIS IS IMPORTANT. Do not neglect it.

For A Strong Public Health Association

Physicians of Minnesota are keenly interested in the welfare of the Minnesota Public Health Association.

Many outstanding members of the profession serve on its board of directors and on its executive committee. All of them have come to appreciate, within the last few years, especially, the wise administration of its tuberculosis program as well as its value, generally, to the public health of Minnesota.

Incidentally, they also value the benefits derived both by the public health association and the medical profession from the close affiliation that exists between the two organizations.

Through this affiliation, physicians have united wholeheartedly to give their time and assistance to public health association projects and to guide them into proper channels. The public health organization, on its side, having the inestimable benefit of the assistance and counsel of Organized Medicine, has thrown its resources and backing to the support of fundamental medical policies in Minnesota.

Well-Rounded Program

The result has been a well-rounded, well-planned public health program that has been conspicuous all over the country.

There is also the practical benefit of shared office space and equipment and shared personnel which has accrued to both organizations. Without this pooling of resources neither organization could afford to carry on its present extensive programs.

Central Leadership Essential

Physicians, then, see clearly the necessity for the present strong central organization of the Minnesota Public Health Association and its preservation on its present basis. They realize, also, the extreme inadvisability of supplanting such an organization by several independent local organizations, all supported by Christmas Seals but working at cross purposes and without reference to the programs of fellow organizations.

The present position of strength and central leadership of the Minnesota State Medical Association is a case in point. If the big city medical societies were to separate from the central state organization the effectiveness of all would be seriously limited. Central direction is certainly just as important for a public health program as for a medical organization—particularly when that health program has for its foremost objective the control of tuberculosis in Minnesota.

For Proper Support

Financial support for the activities of the Minnesota Public Health Association is derived from the sale of Christmas Seals. It is evident that a generous percentage must be centralized in a common fund if support is to be distributed where it is most needed throughout the state.

It is to be hoped that no local programs or committees will allow their individual ambitions, however praiseworthy, to stand in the way of support for this strong central organization.

Wausau Meeting

A significant and unusual medical conference was held in Wausau, Wisconsin, recently.

It was called and independently sponsored by the Employers Mutual Insurance Company. The program was devoted exclusively to traumatic surgery. There was no discussion of economics, no advertising.

Some 250 physicians from Minnesota, Wisconsin, Iowa, Nebraska and Illinois attended and all of them were enthusiastic about the program and entertainment which included, beside the two days of scientific program, a banquet at which Dr. Morris Fishbein gave one of his characteristic and very entertaining talks.

Practical Education

The entire conference was obviously well worthwhile. It appeared to meet a need that is not given sufficient attention through the customary channels of medical education. It was a practical conference on a subject which bulks large these days in medical practice. The speakers were well chosen and they handled their subjects with a view to giving their hearers practical assistance in their handling of injury cases.

The truth may be that medical schools are not instructing their students thoroughly enough on the surgery of accidents. Attempts have been made by medical and surgical societies to make up for this omission, but the attempts have been somewhat intermittent and ineffective. The reason may be that too many programs feature the speaker in a narrow field rather than the discussion of the everyday problems that confront the doctor.

Significant Departure

In any case, the enthusiasm shown by the men who attended this meeting should be of significance for both our schools and our societies.

There is another significance, too, which should not be overlooked by thoughtful medical men. This was a meeting of medical men called by a commercial organization, a new departure in post graduate medical education. There is no doubt that it was a well conducted meeting and that it met a definite need; but why were not our own medical organizations or our own Universities conducting this and similar conferences?

Are we slipping into academic ruts? If we are, then commercial organizations such as the insurance companies will be forced to take over important fields of education and the future of independent medicine is surely in danger.

Two Rulings on Old Age Assistance

The Honorable Harry H. Peterson, Attorney General of the State of Minnesota, has recently issued two rulings on Old Age Assistance that are of considerable importance to physicians.

In the first Mr. Peterson holds that a grant to a recipient of old age assistance may properly include items for medical, dental, surgical and nursing care, and also hospital assistance. The specific question being:

"May an Old Age Assistance grant properly include items for medical, dental, surgical or hospital assistance or nursing care?"

The response was:

"We answer this inquiry in the affirmative."

Right to Medical Assistance Affirmed

In the second ruling Mr. Peterson holds that the relief agencies in the various counties may grant medical, dental, surgical and nursing care, also hospital assistance, to a recipient of old age assistance even though such recipient is not receiving the maximum amount of assistance allowed under the Old Age Assistance Act. The specific question being:

"Some of the relief offices in the counties have raised the question of whether or not Section 5 (c) of the Minnesota Old Age Assistance Act gives them authority to grant relief for medical, dental, etc., care unless and until the Old Age Assistance Recipient is receiving the maximum amount of \$30 per month.

"Hence, we should also like to have your ruling on the question of whether or not the relief agencies in the various counties may grant medical, dental, etc., care to a Recipient of Old Age Assistance when such Recipient is not receiving the maximum amount of Assistance allowed under the Old Age Assistance Act?"

The response to this question was also:

"We answer this question in the affirmative."

Every member of the medical profession should certainly familiarize himself with these two questions and the rulings of Mr. Peterson. These interpretations of the law make very clear the right of medical men and others to some reasonable compensation for services to the pensioner group.

Drouth Sequelae

Drouth relief in Minnesota will take the form of WPA employment for drouth victims.

Thus, in the thirty-five counties that had been accepted for federal drouth relief as this issue went to press, a total of approximately 25,000 persons were being added to WPA rolls. In fact, officials look for a larger WPA employment roll than at any time since its establishment in Minnesota.

Like other WPA workers, these drouth victims will receive a base pay of \$48.40 a month for unskilled labor; and like other WPA workers they will not be eligible for direct relief or for any medical relief from the various county relief offices. It is possible, in the case of serious emergencies involving large amounts of money, that county commissioners may be persuaded to pay medical bills. In these cases, physicians should be warned to lose no time in making whatever arrangements may be necessary with county officials. For the payment of ordinary bills, however, complete responsibility rests with WPA clients, whether drouth victims or not, and the client himself is expected to make his own arrangements with the physician.

Officials Will Assist

Physicians will have all possible moral support from officials of the Works Progress Administration in making financial arrangements with these patients.

It is the expectation and desire of WPA officials that the workers shall pay ordinary medical bills, if not in full, at least in small monthly payments. Where the worker fails to make any attempt to pay, the doctor is requested to write Association Headquarters, 11 W. Summit Avenue, Saint Paul, so that WPA headquarters can be informed and pressure can be brought to bear upon the client to pay his bills.

The inadequacy of base rates of the WPA security wage, so far as medical care is concerned, has been pointed out frequently and frequently acknowledged by the WPA administration. Every effort will be made by Minnesota officials to alleviate the situation wherever possible and to secure some official adjustment in future regulations.

Following are the counties accepted to date for drouth relief:

Grant	Isanti	Wadena
Pope	Kanabec	Benton
Douglas	Kittson	Kandiyohi
Stevens	Lyon	Lincoln
Traverse	Marshall	Crow Wing
Swift	Mille Lac's	Hubbard
Big Stone	Morrison	Pine
Yellow Medicine	Norman	Aitkin
Wilkin	Otter Tail	Cass
Anoka	Sherburne	Chisago
Becker	Stearns	Ramsey
Clay	Todd	

Building Confidence

(A monthly editorial contributed by the Medico-Legal Advisory Committee)

The business world for several years has found itself in a state of chaos. Professional men have sensed this uneasy situation and have wondered which way the pendulum for the professions might be swinging.

There has been a change of religious feeling of the world, a sense of uncertainty, a lack of confidence, a breaking down of moral restraints; and, more to be regretted, a let down in the ethics of all professions due to the financial plight in which the men in these professions have found themselves.

But confidence, which the medical profession should never have lost, is now being gradually restored to us. We see the light through coöperative efforts. If we play the game well and honestly together, we need not worry about the future—the reward is ours in the work itself. If the "thrill" of the game is lacking, we may as well get out and make room for better players.

A physician's relation to the life of the community is one of most intimate character. Therefore, his reputation should be above reproach and his conduct unimpeachable. If he serves his clientele with integrity, gives his advice in terms of veracity and candor, he can afford to give his time unstintingly to the loyal, zealous care of the sick. There is work for all who wish that work. Perhaps the financial gains may not be so great as desired, but the satisfaction of work well done will be shown by happiness in the hearts and lives of those whom he has served unselfishly.

Your Medico-Legal Advisory Committee urges especially more consultations over difficult cases

during these times, and in order that the confidence of the patient in medical men may be furthered, that all envy and jealousy may be forgotten in the consultation discussion and that the benefit to be derived by the patient may be paramount. The Committee urges also that the consultant under no condition reënter the case unless so requested by the original attendant whose duty it is to make a frank statement to the patient or his family of the findings and conclusions of the consultation and the results expected.

Much of the feeling of distrust which is engendered by a long, continued, difficult case or through unwise words spoken by friends or relatives of the patient may be turned to renewed confidence by a consultation properly conducted. One more means of stopping malpractice litigation is accomplished thereby.

In Red and Black

"Who Wants Socialized Medicine?" asks an attractive little pamphlet printed in red and black ink and distributed by the Public Relations Committee of the Michigan State Medical Society.

Here is a little bit of printing that is as arresting and attention-catching as the Picture Books on Costs of Medical Care published several years ago by the Julius Rosenwald Fund.

Both are clever propaganda and if there was a place for one, there is certainly a need for the other.

The Michigan booklet lists in black arrows on the cover the people who do NOT want socialized or state medicine. They are the Public, the Patient, the Farmer, the Employed, the Taxpayer and the Physician. In startling red arrows appear the classes of persons who DO want it. They are listed as the Profit Seekers, the Paid Reformer, the Unscrupulous Politicians and the Philanthropists' Paid Agents. To these might be added some Misguided Theorists.

For Debaters

Inside the covers, succinct little statements appear about each of these classes of the population with figures and facts to back each assertion.

An interesting and valuable little book. It

would have been welcomed eagerly by last year's high school debaters on state medicine. But the debate on state medicine is only in its early stage on a larger platform and before much larger audiences, all of whom would find it interesting. Copies can be secured from the Public Relations Committee of the Michigan State Medical Society, 2020 Olds Tower, Lansing, Michigan.

Minnesota State Board of Medical Examiners

Resolutions Adopted by Board

The following resolutions were adopted by the Board at a meeting held May 4, 1936.

RESOLVED: That the minimum general average permitted in order for candidates to obtain a license must be seventy-five per cent.

RESOLVED: That the candidates for license who fail to obtain the minimum mark in any two subjects upon which an examination is required shall be required to repeat the examination in those two subjects at the next regular examination without the payment of an additional fee.

RESOLVED: That the candidates for license who fail to obtain the minimum mark in any three subjects upon which an examination is required shall be required to repeat the entire examination in all subjects, and pay the regular fee required by law.

RESOLVED: That all former rules adopted by the Board inconsistent with these resolutions be hereby rescinded.

Complaint Filed Against Unlicensed Chiropractor at Windom, Minnesota

Re: State of Minnesota vs. Nitzke.

Following a report to the Minnesota State Board of Medical Examiners that one A. A. Nitzke was representing himself to the public as a chiropractor at Windom, Minnesota, an investigation was made. This investigation disclosed that Nitzke, who is not registered under the Basic Science Law in Minnesota, and who is not licensed to practice chiropractic in this State, was in charge of the chiropractic office of one M. E. Tegels. Tegels had left on a trip to be gone about six weeks and had placed Nitzke in charge of his office. When Nitzke was interviewed by Mr. Brist on behalf of the Board, Nitzke stated that he had a Basic Science Certificate and was licensed to practice chiropractic. The records, however, disclose otherwise. Evidence was obtained that during the week of July 6, 1936, Nitzke gave chiropractic treatments to a number of Dr. Tegel's patients. On July 14, 1936, a complaint was filed against Nitzke charging him with practicing healing without a Basic Science Certificate. Before the warrant could be served upon Nitzke he apparently left the State. The records disclose that Nitzke practices chiropractic at Storm Lake, Iowa. However, he has no authority whatever to practice in the State of Minnesota, and he will not be permitted to do so unless licensed. If he returns to this State at any time in the future, he will have to face the complaint that has been filed against him.

The Minnesota State Board of Medical Examiners respectfully requests that any one having any information indicating that Nitzke has returned to the State of Minnesota, get in touch with the Board at 524 Lowry Medical Arts Building, St. Paul.

OF GENERAL INTEREST

Dr. M. H. Nathanson left Minneapolis last month for Los Angeles, where he will continue the practice of internal medicine.

* * *

Dr. M. N. Moss of Saint Paul recently moved to Philadelphia, where he will continue the practice of obstetrics and gynecology.

* * *

Dr. Josephine Tofte has severed her connection with the Oak Hill Rest Home in St. Cloud, Minnesota, and is temporarily located in Minneapolis.

* * *

Dr. P. C. Pilon of Paynesville, Minnesota, has returned from Europe where he and Mrs. Pilon spent the summer visiting relatives of Mrs. Pilon.

* * *

The marriage of Miss Winifred Rita O'Reilly and Dr. Richard Peter Neary of Minneapolis will take place Saturday morning, September 5, in the Church of St. Anthony of Padua.

* * *

The practice of Dr. J. A. Roy of Red Lake Falls, who is ill, will be taken over for an indefinite period by Dr. L. S. Arling, a graduate of the University of Minnesota Medical School in 1934.

* * *

A committee of three psychiatrists, Dr. Henry A. Michael, Minneapolis, Dr. E. M. Hammes, and Dr. Gordon R. Kamman, Saint Paul, has been appointed to determine the mental status of prisoners at the State Penitentiary at Stillwater.

* * *

Dr. Thomas Broadie, acting superintendent of Ancker Hospital, Saint Paul, since the death of Dr. S. R. Lee, August 10, was appointed superintendent on August 24. Dr. Broadie received his medical degree at the University of Indiana and has been assistant superintendent since July 1931.

* * *

Dr. D. G. Mahle, a graduate of the University of Minnesota Medical School, 1935, has located in Plainview, Minnesota, for the practice of medicine. Mrs. Mahle, who is a graduate of the University of Minnesota Nursing School, is a public health nurse and for the past few years has been actively engaged in nursing in Minneapolis.

* * *

Dr. William L. Wall became resident physician at the Gates Hospital in Anoka, Minnesota, August 7. He is a graduate of the University of Minnesota Medical School and has been in general practice in Osceola, Wisconsin, for a short time. He succeeds Dr. H. J. Aldrich who is now with the Civilian Conservation Corps as camp doctor.

Dr. Floyd M. Burns, graduate of the University of St. Louis and for the past year having served as interne in a hospital in Quincy, Illinois, has arrived home at Milan, Minnesota, where he will join with his father, Dr. M. A. Burns, in the practice of medicine. The elder Dr. Burns has practiced medicine in Milan for the past forty years.

* * *

Dr. John Haskins, formerly located in Northfield, Minnesota, and for the past few years a member of the staff of the New York State Hospital at King's Park, Long Island, has accepted a position as supervisor of Morningside Hospital, the government hospital for Alaskan insane at Portland, Oregon, where he took up his new duties the latter part of July.

* * *

On the evening of August 20, 1936, a group of physicians gave an informal farewell dinner at the Minneapolis Club for Dr. H. A. Reimann, who is leaving the University of Minnesota Medical School to become the Magee Professor of Medicine at the Jefferson Medical College of Philadelphia. Appreciation of the guest of honor and sincere regret at his departure were expressed by those called on by Dr. Moses Barron, master of ceremonies, to "say something."

* * *

The Department of Preventive Medicine and Public Health of the University of Minnesota Medical School will offer graduate work for physicians and engineers contemplating entering the field of Public Health. The School of Public Health Nursing has also made special arrangements to provide special training for nurses who are expected to come to the University from the surrounding states under the provisions of the Social Securities Act. Registration for these courses begins September 24 and lectures will start September 30.

* * *

Dr. William T. Nygren of Braham, Minnesota, has announced that Dr. P. C. Petersen, for the past two years a practicing physician in Ogilvie, Minnesota, will be associated with him in practice and also in work at the Braham Hospital which is operated by Dr. Nygren. Dr. Petersen is a graduate of the University of Nebraska, 1932, and served his internship at Northwestern Hospital, Minneapolis, where he also was house physician the following year. Dr. Nygren is in Chicago this month taking postgraduate work in abdominal surgery at the Cook County Hospital in Chicago.

* * *

As a result doubtless of the recent revelations of the defective plumbing in certain Chicago hotels the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association passed a resolution at a meeting held in St. Louis, Missouri, February 25, 1936, calling attention of school boards and executives to the advisability of instituting surveys of the plumbing in educational institutions to ascertain whether or not the

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

danger of back siphonage and consequent pollution of water supply mains may exist. The Committee is giving all possible publicity to the resolution.

* * *

Preliminary announcements have just been made by the Extension Division of the University of Minnesota of two evening medical extension courses of more than ordinary interest—one on "Practical Preventive Medicine" to be conducted by Drs. H. S. Diehl and K. F. Maxcy, in Room 129, Millard Hall; the other on "The Newer Knowledge of Tuberculosis" to be conducted by Dr. J. A. Myers, in the Amphitheater of the University Hospital. Both courses will be held on Thursday evenings for seventeen weeks, the first from 6:20 p. m. to 8 p. m. and the second at 8 p. m. The date of the first meeting is to be announced later. Courses are open to graduate physicians and were planned on the same night for their convenience. Registration should be made through R. R. Price, Director of the Extension Division.

* * *

Sir Henry Wellcome, who was introduced to members of the medical profession attending the Monday evening meeting of the Minnesota State Medical Association last May in Rochester, Minnesota, died on July 25, 1936, at the age of eighty-three in London, following an operation. A founder of the Burroughs Wellcome Company, the Wellcome Historical Medical Museum and the Wellcome Research Institute, Sir Henry Wellcome has left a lasting imprint on the pages of history. Born in 1853 in a log cabin near Almond, Wisconsin, he began his career as a pharmacist in Rochester, Minnesota. After studying pharmacy in Philadelphia his path led to London and eventually he became a leader in his chosen field, both in the United States and in England. His interests extended beyond mere pharmaceutical manufacturing to archeological expeditions in the Upper Nile, sanitation in the Panama Canal zone, the Gorgas Memorial Institute, a Maternity Hospital in Uganda, Chinese medicine and a bacteriological motor field laboratory for use of the British Army in Palestine and Egypt during the World War. Henry Wellcome became a naturalized English citizen during the war and was knighted for his many contributions to science.

* * *

The eighth annual training course for Medical Department Reservists of the Army and Navy will be held at the Mayo Foundation, Rochester, Minnesota, from October 4 to 17, 1936.

This training course was first inaugurated by the Seventh Corps Area at the request of the Mayo Foundation to give training in military medicine to the younger medical men connected with the Foundation. Other reserve officers requested permission to enroll and to take advantage of the opportunity to attend clinical presentations during the morning hours. Such

permission was granted and such attendance has become so increasingly popular that it is now necessary to limit the enrollment.

The program will follow the plan of the past years. The morning hours will be devoted entirely to professional work in special clinics and study groups. Officers in attendance may select the course they wish to follow from the wide variety of presentations offered. The afternoons and evenings will be devoted to a medicomilitary program under the direction of the Surgeon of the Seventh Corps Area (Army) and the Surgeon of the Ninth Naval District (Navy).

This training is on an inactive duty status and is without expense to the Government. Enrollment is open to all Army and Navy reservists of the Medical Departments in good standing. Application should be submitted to the Surgeon of the Seventh Corps Area, Omaha, Nebraska, or the Surgeon, Ninth Naval District, Great Lakes, Illinois. Enrollment is limited to two hundred.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for September

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 9:45 o'clock every Tuesday morning over Station WCCO, Minneapolis, and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

September 1—Causes of Blindness

September 8—Plantar Warts

September 15—Fear in Childhood

September 22—Gout

September 29—Loss of Teeth

The American Board of Internal Medicine (Inc.)

The American Board of Internal Medicine, incorporated February 28, 1936, completed its organization on June 15, 1936. The officers chosen were Walter L. Bierring, M.D., Des Moines, Chairman; Jonathan C. Meakins, M.D., Montreal, Vice Chairman; and O. H. Perry Pepper, M.D., Philadelphia, Secretary-Treasurer. These officers with the following six members constitute the present membership of the board: David P. Barr, M.D., St. Louis; Reginald Fitz, M.D., Boston; Ernest E. Irons, M.D., Chicago; William S. Middleton, M.D., Madison; John H. Musser, M.D., New Orleans, and G. Gill Richards, M.D., Salt Lake City.

Each applicant for admission to the examination in internal medicine will be required to meet the following standards:

GENERAL QUALIFICATIONS

1. Satisfactory moral and ethical standing in the profession.
2. Membership in the American Medical Association or, by courtesy, membership in such Canadian or other medical societies as are recognized for this purpose by the Council on Medical Education and Hospitals of the American Medical Association. Except as here provided, membership in other societies will not be required.

PROFESSIONAL STANDING

1. Graduation from a medical school of the United States or Canada recognized by the Council on Medical Education and Hospitals of the American Medical Association.
2. Completion of an internship of not less than one year in a hospital approved by the same council.
3. In the case of an applicant whose training has been received outside of the United States and Canada, his credentials must be satisfactory to the Advisory Board for Medical Specialties and the Council on Medical Education and Hospitals of the American Medical Association.

SPECIAL TRAINING

1. Five years must elapse after completion of a year's internship in a hospital approved for interne training before the candidate is eligible for examination.
2. Three years of this period must be devoted to special training in internal medicine. This requirement should include a period of at least several months of graduate work under proper supervision in anatomy, physiology, biochemistry, pathology, bacteriology, or pharmacology, particularly as related to the practice of internal medicine. This work may be carried on in any domestic or foreign medical school or laboratory recognized by the Council on Medical Education and Hospitals of the American Medical Association as offering appropriate facilities for this type of postgraduate experience; or it may include a period of at least several months of graduate work under proper supervision in internal medicine or in its restricted and specialized branches in any domestic or foreign hospital, clinic, or dispensary, recognized by the above Council as offering appropriate facilities for this type of postgraduate experience.
3. A period of not less than two years of special practice in the field of internal medicine or in its more restricted and specialized branches.

The American Board of Internal Medicine does not propose to establish fixed rules for the preliminary training of candidates for certification in this field. Broad general principles for training, however, may be outlined, although such suggestions as are made must, of necessity, be subject to constant changes reflecting the dynamic nature of the specialty.

A sound knowledge of physiology, biochemistry, pharmacology, anatomy, bacteriology, and pathology, in so far as they apply to disease is regarded as essential for continued progress of the individual who practices internal medicine. The mere factual knowledge of medicine and its basic sciences is not sufficient. The candidate must have had training in their use in furthering his understanding of clinical medicine. This implies practical experience under the guidance of older men who bring to their clinical problems ripe knowledge and critical judgment. Preparation to meet this requirement adequately may be even more difficult to obtain than the so-called scientific training. It may, however, be acquired in the following ways:

- (a) By work in a well-organized hospital outdoor clinic conducted by competent physicians.
 - (b) By a prolonged period of resident hospital appointments likewise directed by skilled physicians.
 - (c) By a period of training in intimate association with a well-trained and critical physician who has taken the trouble to teach and guide his assistant rather than to require him only to carry out the minor drudgery of a busy practice.
4. The Board does not consider it to be the best interests of internal medicine in this country that rigid rules as to where or how the training outlined above is to be obtained. Medical teaching and knowledge are international. The opportunities of all prospective candidates are not the same. Some may have the opportunity of widening their knowledge by a period of study abroad. Others, at the other extreme, may be restricted to a comparatively narrow geographic area and their detailed training must be obtained in short periods scattered over a long time. Although it is laid down that at least five years must elapse between the termination of the first interne year and the time when the candidate is eligible to take the examination, a longer period is advisable. The Board wishes to emphasize that the time and training are but means to the end of acquiring a broadness and depth of knowledge of internal medicine which the candidate must demonstrate to the Board in order to justify it in certifying that he is competent to practice internal medicine as a specialty. The responsibility of acquiring the knowledge as best he may rests with the candidate, while the responsibility of maintaining the standard of knowledge required for certification devolves on the Board.

METHODS OF EXAMINATION

The examination required of candidates for certification as specialists in Internal Medicine will comprise, Part I (written) and Part II (practical or clinical).

PART I The written examination is to be held simultaneously in different sections of the United States and Canada and will include:

- (a) Questions in applied physiology, physiological chemistry, pathology, pharmacology, and the cultural aspects of medicine.
- (b) Questions in general internal medicine.

The first written examination will be held in December, 1936, and candidates successful in this written test will be eligible for the first practical or clinical examination which will be conducted by members of the Board near the time for the annual session of the American College of Physicians at St. Louis in April, 1937. The second practical examination will be held at Philadelphia near the time of the annual session of the American Medical Association in Atlantic City in June, 1937.

The fee for examination is forty dollars which must accompany the application and an additional fee of ten dollars is required when the certificate is issued.

Application blanks and further information can be obtained by addressing the office of the chairman, Walter L. Bierring, M.D., 406 Sixth Avenue, Des Moines, Iowa, U. S. A.

National Medical Council on Birth Control

Members of the Minnesota State Medical Association will undoubtedly view the recent formation of a National Medical Council on Birth Control as a great advance in the medical progress of birth control. The Council is made up at present of seventy-one physicians from twenty-three states. The function of this Council is "to initiate, encourage and execute appropriate scientific research in the medical aspects of birth control." Although an autonomous body, this Council will control and supervise all medical policies of the American Birth Control League.

It has been felt for some time by many outstanding members of the medical profession and by many prominent lay organizations and individuals that there should be some autonomous medical organization, national in its make-up and commanding entire confidence and authority by virtue of the training, character and reputation of its members, to which medical problems of birth control, from any source, could be referred for study, solution and recommendation for action.

The formation of this Council is another evidence that the medical profession of this country is assuming its accustomed leadership and is planning to meet its obvious responsibility and obligation in this field of public health and preventive medicine as it has always met its responsibilities and obligations in the past.

The executive committee of the Council is headed by Dr. Frederick C. Holden, New York, chairman, and Dr. Eric M. Matsner, New York, executive secretary. Included in the membership of the Council appear the names of Dr. Fred L. Adair, Chicago; Dr. John Erdmann, New York; Dr. J. Shelton Horsley, Richmond; Dr. Floyd E. Keene, Philadelphia; Dr. R. T. La Vake and Dr. J. C. Litzenberg, Minneapolis; Dr. W. A. Pusey, Chicago; Dr. Milton C. Winternitz, New Haven.

INTERNATIONAL MEDICAL ASSEMBLY

Inter-State Post Graduate Medical Association of North America

October 12-16, 1936, Saint Paul, Minnesota

PROGRAM

Pre-Assembly Clinics, October 10

Post-Assembly Clinics, October 17

Saint Paul Hospitals

Monday, October 12

8:00 A. M.

Diagnostic Clinic: "Coronary Thrombosis and Angina Pectoris."

DR. FRED M. SMITH, Professor of Theory and Practice of Medicine, State University of Iowa College of Medicine, Iowa City, Iowa.

Diagnostic Clinic: "Diseases of the Thyroid Gland."

DR. ROBERT S. DINSMORE, Cleveland Clinic, Cleveland, Ohio.

Diagnostic Clinic: "Rheumatoid Arthritis."

DR. RUSSELL L. HADEN, Chief of Medical Division, Cleveland Clinic, Cleveland, Ohio.

Diagnostic Clinic: "Trigeminal Neuralgia."

DR. FRANCIS C. GRANT, Assistant Professor of Neurological Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pa.

Diagnostic Clinic: "Pathologic Physiology of the Common Bile Duct and Its Relation to Disease of the Biliary Tract."

DR. WALTMAN WALTERS, Associate Professor of Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

1:00 P. M.

Address: "Obstetric Hemorrhages and Their Treatment."

DR. JENNINGS C. LITZENBERG, Professor of Obstetrics and Gynecology, University of Minnesota Medical School, Minneapolis, Minn.

Address: "Relation of the Endocrine Glands to Sterility."

DR. EMIL NOVAK, Associate Professor of Obstetrics, University of Maryland School of Medicine, Baltimore, Md.

Address: "The Radical Cure of Malignant Tumors of the Bladder."

DR. HUGH H. YOUNG, Professor of Urology, Johns Hopkins University School of Medicine, Baltimore, Md.

Address: "Treatment of Diabetes during Surgical Emergencies."

DR. HERMAN O. MOSENTHAL, Professor of Clinical Medicine, New York Postgraduate Medical School, New York, N. Y.

Address: "Problems in the Diagnosis of Diabetes."

DR. ROBERT D. LAWRENCE, M.A., M.D., F.R.C.P., Physician to Kings College Hospital, Diabetic Department, London, England.

Address: "Neurological Surgery."

DR. LOYAL DAVIS, Professor of Surgery, Northwestern University School of Medicine, Chicago, Illinois.

7:00 P. M.

Address: "Endocrine Disorders in Childhood."

DR. FREDERICK W. SCHLUTZ, Richard T. Crane Professor of Pediatrics, University of Chicago School of Medicine, Chicago, Ill.

Address: "Peritonitis."

DR. FREDERICK A. COLLIER, Professor of Surgery, University of Michigan Medical School, Ann Arbor, Mich.

Address: "Very Recent Advances in Medicine."

DR. RUSSELL M. WILDER, Professor of Medicine, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

Address: "Practical Points in Clinical Surgery."

DR. W. WAYNE BARCOCK, Professor of Surgery and Clinical Surgery, Temple University School of Medicine, Philadelphia, Pa.

Address: "Intravenous Anesthesia."

DR. JOHN S. LUNDY, Professor of Anesthesia and Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

Tuesday, October 13

8:00 A. M.

Diagnostic Clinic: "Clinical Nutritional Disease (Vitamin B Deficiency)"

DR. ANDREW ALMON FLETCHER, University of Toronto, Canada.

Diagnostic Clinic: "Diagnosis and Treatment of Brain Tumors."

DR. WALTER E. DANDY, Adjunct Professor of Neurological Surgery, Johns Hopkins University School of Medicine, Baltimore, Md.

Diagnostic Clinic: "The Diagnosis of Bone Lesions."

DR. DEAN D. LEWIS, Professor of Surgery, Johns Hopkins University School of Medicine, Baltimore, Md.

Diagnostic Clinic: "Tumors of the Breast."

DR. JOHN F. ERDMANN, Attending Surgeon of the New York Postgraduate Hospital and Medical School, New York, N. Y.

Diagnostic Clinic: "The Psychobiology of the Peptic Ulcer Patient."

DR. GEORGE DRAPER, Associate Professor of Clinical Medicine, Columbia University College of Physicians and Surgeons, New York, N. Y.

1:00 P. M.

Diagnostic Clinic: "Treatment and Guidance of Patients with Damaged Hearts."

DR. DAVID RIESMAN, Professor of Clinical Medicine and Professor of History of Medicine, University of Pennsylvania School of Medicine, Philadelphia, Pa.; President, Inter-State Post Graduate Medical Association.

Address: "The Treatment of Endocervicitis."

DR. WALTER T. DANNREUTHER, Professor of Clinical Gynecology, New York Postgraduate Medical School, New York, N. Y.

Address: "Diffuse Adenomatosis of the Colon."

DR. FRED W. RANKIN, Lexington, Kentucky.

Address: (Subject to be supplied).

DR. FRANCIS J. CHARTERIS, M.D., Ch.B., Professor of Materia Medica and Therapeutics, St. Andrews University School of Medicine, St. Andrews, Scotland.

Address: "Factors Frequently Overlooked in the Management of the Patient with Heart Disease."

DR. CHARLES A. ELLIOTT, Professor of Medicine, Northwestern University School of Medicine, Chicago, Ill.

Address: "The Diagnosis of Intracranial Complications of Aural and Nasal Sinus Suppuration."

DR. WELLS P. EAGLETON, Oalr., Newark, New Jersey.

Address: "Treatment of Acute and Chronic Mastoiditis."

DR. MATTHEW S. ERSNER, Professor of Otolaryngology, Temple University School of Medicine, Philadelphia, Pa.

7:00 P. M.

Address: "The Consideration and Management of Some of the More Common Congenital Deformities of the Rectum."

DR. VERNON C. DAVID, Clinical Professor of Surgery, Rush Medical College, Chicago, Illinois.

Address: "The Diagnosis and Treatment of Tumors of the Bladder by Means of the Roentgen Rays"

DR. GEORGE E. PFAHLER, Professor of Radiology, University of Pennsylvania Graduate School of Medicine, Philadelphia, Pa.

Address: "The Cerebral Regulation of Autonomic Function."

DR. JOHN F. FULTON, Sterling Professor of Physiology, Yale University School of Medicine, New Haven, Conn.

Address: "Syphilis of the Heart and Blood Vessels."

DR. MAURICE C. PINCOFFS, Professor of Medicine, University of Maryland School of Medicine, Baltimore, Md.

Address: "The Management of Intestinal Obstructions."

DR. OWEN H. WANGENSTEEN, Professor of Surgery, University of Minnesota Medical School, Minneapolis, Minn.

Wednesday, October 14

8:00 A. M.

Diagnostic Clinic: "Paralyses in Children."

DR. BRONSON CROTHERS, Assistant Professor of Pediatrics, Harvard University Medical School, Boston, Mass.

Diagnostic Clinic: "Carcinoma of the Stomach."

DR. DONALD C. BALFOUR, Professor of Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

Diagnostic Clinic: "Economic Advantages of Early Protected Weight-Bearing in Fractures of the Leg, Foot and Ankle."

DR. FRASER B. GURD, McGill University Faculty of Medicine, Montreal, Canada.

Diagnostic Clinic: "Essential Hypertension."

DR. ALFRED W. ADSON, Professor of Neurosurgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

and

DR. E. V. ALLEN, Assistant Professor of Medicine, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

Diagnostic Clinic: "Bodily Type in Relation to Endocrine Function."

DR. CHARLES R. STOCKARD, Professor of Anatomy, Cornell University Medical College, New York, N. Y.

1:00 P. M.

Diagnostic Clinic: "The Nature and Management of Nephritis Edema."

DR. LOUIS H. NEWBURGH, Professor of Clinical Investigation in Internal Medicine, University of Michigan Medical School, Ann Arbor, Mich.

Address: "Circulatory Failure in Acute Infectious Diseases."

DR. WILLIAM R. WILLIAMS, Professor of Clinical Medicine, Cornell University Medical College, New York, N. Y.

Address: "Genesis and Surgical Treatment of Essential Hypertension."

DR. GEORGE CRILE, Cleveland Clinic, Cleveland, Ohio.

Address: "Relation of Diseases of the Sinuses to Organic Disease."

DR. ROBERT F. RIDPATH, Professor of Laryngology and Rhinology, Temple University School of Medicine, Philadelphia, Pa.

Address: "Intrathoracic Goiter."

DR. CHARLES G. HEYD, Professor of Clinical Surgery, New York Postgraduate Medical School, New York, N. Y.

Address: "Non-Surgical Diseases of the Colon."

DR. JOSEPH W. LARIMORE, Associate Professor of Clinical Medicine, Washington University School of Medicine, St. Louis, Mo.

Address: "The Surgical Anatomy of the Anal Canal" (Including Methods of Treatment of Fistula-in-Ano).

MR. C. NAUNTON MORGAN, F.R.C.S., Senior Assistant Surgeon to St. Mark's Hospital for Diseases of the Rectum; Surgeon to the Hospital for Tropical Diseases; Casualty Surgeon to St. Bartholomew's Hospital, London, England.

ASSEMBLY DINNER

7:00 P. M.

Informal

For members of the profession, their ladies and friends.

DR. DAVID RIESMAN, Master of Ceremonies.

Presentation of Token of Appreciation to

DR. CHARLES H. MAYO and DR. WILLIAM J. MAYO, Rochester, Minnesota.

Addresses by eminent members of the profession and other distinguished citizens of the world.

Thursday, October 15

8:00 A. M.

Diagnostic Clinic: "The Relation of the Psychoses to Systemic Diseases."

DR. EARL D. BOND, Professor of Psychiatry, University of Pennsylvania School of Medicine, Philadelphia, Pa.

Diagnostic Clinic: "Indications for Surgery and the Surgical Treatment of Peptic Ulcer."

DR. FRANK H. LAHEY, Director of Surgery in the Lahey Clinic; Surgeon of the New England Baptist Hospital and New England Deaconess Hospital, Boston, Mass.

Diagnostic Clinic: "The Relation of Endocrine Glands to Circulatory Diseases."

DR. LEONARD G. ROWNTREE, Director, Philadelphia Institute for Medical Research, Philadelphia, Pa.

Diagnostic Clinic: "Cryptorchidism."

DR. HUGH CABOT, Professor of Surgery, University of Minnesota Graduate School of Medicine, Rochester, Minn. (Mayo Clinic)

Diagnostic Clinic: "The Relation of Lumbosacral Joint to Low Back Pain."

DR. ALAN DEFOREST SMITH, Clinical Professor of Orthopedic Surgery, Columbia University College of Physicians and Surgeons, New York, N. Y.

1:00 P. M.

Address: "Allergic Diseases."

DR. ROBERT A. COOKE, Assistant Professor of Clinical Medicine, Cornell University Medical College, New York, N. Y.

Address: "Significance of Menorrhagia and Metrorrhagia."

DR. JOHN R. FRASER, Professor of Obstetrics and Gynecology, McGill University Faculty of Medicine, Montreal, Canada.

Address: (Subject to be supplied)

DR. CHARLES H. MAYO, Mayo Clinic, Rochester, Minnesota.

Address: "Applications of Cavity Grafting."

MR. ARCHIBALD H. MCINDOE, M.B., Ch.B. (N.Z.); M.Sc. (Path.); M.S., F.A.C.S.; F.R.C.S. (England), Assistant Plastic Surgeon, Plastic Unit, St. James Hospital, London, England.

Address: "Function and Deformity in Fracture Results."

DR. ELDRIDGE L. ELIASON, Professor of Clinical Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pa.

Address: "The Early Diagnosis of Bronchiogenic Carcinoma."

DR. CHEVALIER JACKSON, Professor of Bronchoscopy and Esophagoscopy, Temple University School of Medicine

and

DR. CHEVALIER L. JACKSON, Professor of Clinical Bronchoscopy and Esophagoscopy, Temple University School of Medicine, Philadelphia, Pa.

Address: "Water Balance in Children."

DR. SAMUEL Z. LEVINE, Acting Professor of Pediatrics, Cornell University Medical College, New York, N. Y.

Address: "The Surgery of Acute and Chronic Compression of the Heart."

DR. CLAUDE S. BECK, Associate Professor of Surgery, Western Reserve University School of Medicine, Cleveland, Ohio.

7:00 P. M.

Address: "Ophthalmic Consultations in a General Hospital."

The Joseph Schneider Foundation Presentation.

DR. LAWRENCE T. POST, Professor of Ophthalmology, Washington University School of Medicine, St. Louis, Mo.

Address: "General Therapeutic Methods for the Protection of Patients in the Extremes of Life."

DR. IRVING S. CUTTER, Dean and Associate Professor of Medicine, Northwestern University Medical School, Chicago, Ill.

Address: "Periodic Health Examination."

DR. REGINALD FITZ, Associate Professor of Medicine, Harvard University Medical School, Boston, Mass.

Address: "The Diagnostic Significance of the Respiratory Rate."

DR. FREDERICK J. KALTEYER, Clinical Professor of Medicine, Jefferson Medical College, Philadelphia, Pa.

Address: "The Sella Turcica."

DR. ERIC OLDBERG, Professor of Neurology and Neurological Surgery, University of Illinois College of Medicine, Chicago, Ill.

Friday, October 16

8:00 A. M.

Diagnostic Clinic: "The Differential Diagnosis of Pain in the Chest."

DR. JOHN A. OILLE, Assistant Professor of Medicine, University of Toronto Faculty of Medicine, Toronto, Canada.

Diagnostic Clinic: "Fracture of the Neck of the Femur: The Problem Fracture."

DR. JOHN J. MOORHEAD, Professor of Clinical Surgery, New York Postgraduate Medical School, New York, N. Y.

Diagnostic Clinic: "Protamine Insulin."

DR. ELLIOTT P. JOSLIN, Clinical Professor of Medicine, Harvard University Medical School, Boston, Mass., and DR. PRISCILLA WHITE, Boston, Mass.

Diagnostic Clinic: "Review of Operative and Non-operative Treatment of Prostatic Obstruction."

DR. WILLIAM E. LOWER, Cleveland Clinic, Cleveland, Ohio.

Address: "The Differential Diagnosis of Chills and Fever."

DR. JAMES H. MEANS, Jackson Professor of Clinical Medicine, Harvard University Medical School, Boston, Mass.

1:00 P. M.

Address: "Diabetes Insipidus."

DR. ELLIOTT C. CUTLER, Moseley Professor of Surgery, Harvard University Medical School, Boston, Mass.

Address: "Treatment of the Elderly Chronic Cardiac."

DR. CARY EGGLESTON, Assistant Professor of Clinical Medicine, Cornell University Medical College, New York, N. Y.

Address: (Subject to be supplied.)

DR. WILLIAM J. MAYO, Mayo Clinic, Rochester, Minn.

Address: "The Applied Physiology of the Sphincter of Oddi."

DR. ANDREW C. IVY, Davis Professor of Physiology and Professor of Pharmacology, Northwestern University Medical School, Chicago, Ill.

Address: "The Acute Abdomen."

DR. IRVIN ABELL, Clinical Professor of Surgery, University of Louisville School of Medicine, Louisville, Ky.

Address: "The Rôle of the Practitioner and the Specialist in the Management of Urinary Tuberculosis."

DR. JOSEPH F. MCCARTHY, Professor of Clinical Urology, New York Postgraduate Medical School, New York, N. Y.

Graduate Fortnight of the New York Academy of Medicine

Two weeks of afternoon clinics at New York hospitals and evening lectures on trauma, occupational diseases and hazards at the Academy of Medicine headquarters have been arranged for the ninth annual Graduate Fortnight of the New York Academy of Medicine, October 19-31, 1936. Physicians in good standing are invited to register and attend. A charge of \$3.00 is made for registration. Further information may be obtained from Dr. Frederick P. Reynolds, the New York Academy of Medicine, 2 East 103rd Street, New York City.

Mayo Foundation Lectures

A special program of lectures and demonstrations in medicine and surgery will be held under the direction of the Mayo Foundation from November 9 to 13, inclusive. Mornings will be devoted to surgical and medical clinics. In the afternoons and evenings symposiums will be conducted on neurology, gynecology, diseases of the ear, nose and throat, laboratory procedures, emergency treatment, pediatrics, and renal diseases. In addition a clinico-pathologic conference will be held. While this program is arranged primarily for the Fellows of the Foundation, visiting physicians are invited to attend.

Mississippi Valley Medical Society

The Mississippi Valley Medical Society, also known as the Tri-State Post Graduate Assembly of Illinois, Missouri and Iowa, will meet at the Hotel Burlington, Burlington, Illinois, September 30, October 1 and 2, 1936. A full three-day program of post graduate instruction will be provided by some forty-seven speakers for the most part from the medical centers of the three states concerned. Subjects with an appeal to the physicians in general practice have been selected. All ethical physicians are invited to register. Dr. H. B. Goodrich, Hannibal, Missouri, is president of the organization and Dr. Harold Swanberg, 211 W. C. U. Building, Quincy, Illinois, is secretary.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

THIRTY-THIRD ANNUAL REPORT OF THE BUREAU OF SCIENCE, Philippine Islands. For the year ending December 31, 1934. A. S. Arguelles. 89 pages. Paper binding. Manila, P. I.: Bureau of Printing, 1936.

MICROBIOLOGY AND PATHOLOGY FOR NURSES. Charles F. Carter, B.S., M.D., Director, Carter's Clinical Laboratory, Dallas, Texas, etc. 682 pages. Illus. Price, cloth, \$3.00. St. Louis: C. V. Mosby Co., 1936.

AN INTRODUCTION TO MATERIA MEDICA AND PHARMACOLOGY. Hugh Alister McGuigan, Ph.D., M.D., Prof. of Materia Medica, Pharmacology and Therapeutics, Univ. of Illinois College of Med., and Edith P. Brodie, A.B., R.N., Formerly Dir. School of Nursing, Vanderbilt Univ., Nashville, Tenn., etc. 580 pages. Illus. Price, cloth, \$2.75. St. Louis: C. V. Mosby Co., 1936.

A DIABETIC MANUAL. For Practitioners and Patients. Edward L. Bortz, A.B., M.D., F.A.C.P., Assoc. Prof. of Medicine, Graduate School of Medicine, University of Pennsylvania, etc. 222 pages. Illus. Flexible binding. Philadelphia: F. A. Davis Co., 1936.

CHEMICAL PROCEDURES FOR CLINICAL LABORATORIES. Marjorie R. Mattice, A.B., Sc.M., Assistant Prof. of Clinical Pathology, N. Y. Post Graduate Medical School of Columbia University, etc. 520 pages. Illus. Price, \$6.50, cloth. Philadelphia: Lea & Febiger, 1936.

ARTHRITIS AND RHEUMATIC DISEASE. Maurice F. Lautman, M.D., Consultant to the U. S. Public Health Service Clinic and Director of Dept. for the Study of Arthritis, Levi Memorial Hospital, Hot Springs, Ark. Foreword by Morris Fishbein. 177 pages. Illus. Price, cloth, \$2.00. New York: McGraw-Hill Book

AMERICAN MEDICAL DIRECTORY. Fourteenth Edition. 2490 pages. Illus. Price \$15.00. Chicago: American Medical Association Press, 1936.

Each time a new American Medical Directory appears, which it does every two years, one is impressed with the magnitude of the undertaking. The volume contains not simply information regarding the 183,312 physicians in the United States and its dependencies and Canada, but a wealth of information in addition. The officers, Constitution and By-Laws and medical ethics of the American Medical Association, a brief history of medical schools, hospitals, including those approved by the Council on Medical Education, and Hospitals for interne training and training in the specialties, medical libraries, medical journals, national and interstate societies, members of special societies, medical laws, are some of the inclusions.

It is interesting to note an increase of 109 doctors and seven hospitals in Minnesota, making a total of 3,283 doctors and 219 hospitals in the State.

A new feature in this edition is the indication of certification as a specialist by an approved examining board. A more complete list of specialists will be con-

tained in the next edition as several more of these boards have already been approved by the Council on Medical Education and Hospitals since the directory went to press.

* * *

WILLIAMS OBSTETRICS. A textbook for the use of students and practitioners. Seventh Edition. Henricus J. Stander, M.D., F.A.C.S., Professor of Obstetrics and Gynecology, Cornell University Medical College; Obstetrician and Gynecologist-in-Chief, New York Hospital, and Director of Lying-in Hospital, New York City. 1269 pages. Illus. New York: D. Appleton-Century Co., 1936.

Those physicians who have the habit of examining completely and meticulously the context and bibliography of each new edition of the outstanding textbooks, will be pleased and amply rewarded in studying the new and seventh edition of Williams Obstetrics by Dr. H. J. Stander, Professor of Obstetrics and Gynecology, Cornell University Medical College.

In the main, the structure of the previous editions has not been changed. Some sections have been rewritten and new data added, all in the same succinct, clear and scholarly manner that characterized the writing of Dr. Williams. The new chapters: the sex hormones; amnesia, analgesia and anesthetics in obstetrics; and urinary complication, are excellent. All added illustrations leave nothing to be desired.

The same general spirit of conservatism that pervaded the other editions is present in this edition. A most needed element in our teaching and practice today. One leaves the study of this splendid work with a consciousness that, in addition to its outstanding scientific worth, it is a notable and inspiring example of a solemn, beautiful and reverent tribute to a great master, conceived and performed in a manner that could not be surpassed.

R. T. LAVAKE, M.D.

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THE PARATHYROIDS IN HEALTH AND DISEASE. David H. Shelling, M.D. 325 pages. Illus. Price \$5.00. St. Louis: C. V. Mosby Company, 1935.

The numerous contributions of recent years to the knowledge of parathyroid function has made most timely the appearance of this monograph. The author gives a comprehensive discussion of the present knowledge of the parathyroid glands and the diseases known to be associated with them. The relationship of the parathyroid hormone to the functions of calcium and phosphorus in the body are ably presented and the comprehensive treatment of hyperparathyroidism is outstanding. The final chapter on the use and misuse of parathyroid hormone is especially worth reading, in view of the present tendency to use this substance therapeutically without rational basis.

JOSEPH F. BORG, M.D.

Treatment of Arthritis by Bee Venom

Attempts have been made repeatedly to place this form of treatment on a scientific foundation. Almost without exception medical reports have been inadequate—inadequate because little attempt at classification of the type of rheumatic diseases treated has been made. Terminology used is most indefinite and indicates lack of familiarity with types of diseases concerned. The terms "rheumatoid heart affections," "endocrine polyarthralgia," "arthritis" and others are used without definition. Beck expressed the opinion that venom therapy has been abandoned because of difficulties in use of live bees. This has been obviated by commercial preparations: Apicosan, immenin, apisin and British bee venom. Beck has attempted to stimulate interest in this method by a review of literature on the subject. He exhibits a lack of critical appraisal of his material, and accepts laymen letters as important evidence. According to Beck, the physiologic effect of bee venom is comparable to histamine, which has been advanced by some for the treatment of rheumatic diseases. These ideas of Beck are not in accord with those accepted by the greater number of writers on the subject. The gross error in Beck's presentation is that he has omitted details of his own experience with treatment. It is stated that patients with "arthritis and rheumatism" possess immunity to bee venom, but in spite of this it has also been repeatedly stated that the results from injection of bee venom in arthritis arise through the production of "a slow, gradual, progressive and comfortable immunization." It is not made clear how one can immunize a person already immune. There are a variety of diseases presumably successfully treated, such as rheumatic fever, endocarditis, Bechterew's spondylitis, myalgia, neuritis, migraine, and others. But, there is no original proof by Beck in support of these statements. Beck's description of the plan of dosage, technic of administration, and reactions are inadequately and unclearly presented. The questioner is referred to Beck's book. Certainly, the place of bee venom therapy in rheumatism is not materially strengthened by this book—(J. A. M. A., May 2, 1936, p. 1588.)

Digitol-Mulford (Sharp & Dohme, Inc. Reaccepted

Digitol-Mulford (Sharp & Dohme, Inc.) has recently been before the Council on Pharmacy and Chemistry, since the three year acceptance period for inclusion in New and Non-official Remedies has expired. The Council reports that there was published a Notice of Judgment (N. J. 22335) in which it was charged that a shipment of Digitol was found to have almost double the potency represented by the company—"Tincture Digitalis U.S.P. Strength." In view of this, pharmacologic assays were made during the spring of 1935. Specimens of Digitol were purchased from retail drug stores in four widely separated parts of the country and submitted to a well known pharmacologist, who reported that Digitol was found to be neither weaker nor stronger than the U.S.P. tincture. The labels, carton and circulars submitted to the Council were found to be satisfactory. The Council voted that the product be reaccepted for New and Non-official Remedies. (J. A. M. A., August 24, 1935, p. 599.)

THE AGE FACTOR AND INTENSITY OR EXTENT OF GALL TRACT DISEASE AS THERAPEUTIC DETERMINANTS*

E. L. TUOHY, B.A., M.D., F.A.C.P.

Duluth

THE surgery done in America for gall tract disease (chiefly cholecystectomy) in the past twenty years is not to be unconditionally condemned. Where it is indicated, it is a decisive surgical triumph; the patients are comfortable and satisfied. The low immediate mortality attests its technical excellence. Some experienced observers may not believe that there is a need for a review of the surgical indications; others may imply that the subject is one for surgeons and not for internists. We may easily dispose of the implication by asking you to infer the obvious: medical men who do not operate share with the surgeon the responsibility for advising surgery. Where the results have not been satisfactory they fall heir to embarrassing explanations. A plethora of surgical and medical articles upon this subject testifies in general that if the patients were more wisely chosen for operation those that need it would accept it less reservedly. In like manner, the medical treatment, such as it is, would be more popular if it were not equally damned by faulty application and devised chiefly as a barrier to keep the surgeon out of the abdomen! The line of cleavage between medical and surgical treatment in general has been too tightly drawn; and nowhere is a proper merging of the two more essential than in the field of my discussion. We hold sessions such as these to bring to our patients, through our attendance, the advantages of general medical advancement. We attempt to crystallize opinion, to standardize prac-

tice and provide a clearing house for the interpretation of the current literature and research.

Successful surgery carries with it an inherent tendency towards over-aggressiveness and unwarranted extension. It is both popular and intriguing, this matter of going to the bottom of things and "ablating the disease!"† In abdominal surgery the appendix provided the "grand opening," and it has held its place on the surgical boards, although the enthusiasm for its removal, except where a known or strongly suspected disease is present, has greatly cooled. The onslaught upon the gallbladder was greatly fostered by the assumption that it was comparable to the appendix, a useless organ, often the seat of primary inflammatory disease—if pathology could be demonstrated in it, the earlier it was removed the better. And so, the procession started. So long as a rather plentiful crop of badly diseased gallbladders obtained in every community no great harm was done. However, the "open season" for gallbladders came; the roentgen positivity (Graham-Cole technic) arrived; and lo! that was the agency, brilliant in itself, but designed by Fate to place all dubious gallbladder folks in jeopardy. Here was an agency which made it possible to make objective, certain early evidence of physiological perversion in the matter of biliary function. Almost anyone afflicted with gas and with some sort of intra-abdominal discomfort became a possible candidate for

*From the Medical Department of the Duluth Clinic, Duluth, Minnesota. Read before the meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 4-6, 1936.

†It is indeed curious how limited the field of surgery would be if such ablation alone obtained. Except for neoplasms, benign or malignant, or the obtruding and diseased appendix, little else would remain. Rather does the skilled surgeon perform physiological rather than anatomical miracles.

cholecystectomy, even as twenty years earlier appendectomy resulted. The surgeon had simply transferred his allegiance, and in search of objectivity discarded subjective analysis in terms of history, a weighing of constitutional background, exactitude in interpretation of pain, disregarded proven methods of simple physical diagnosis to acclaim a few high powered laboratory or roentgen specifics.

All this is trite. Perhaps I may the more directly hit to the heart of this problem by referring you to the address read before this association in June of last year (1935) at the meeting in Minneapolis by Dr. Edmund Andrews,[‡] Professor of Surgery at Chicago University Medical School. I think I may safely state that most of you have read that article and that few would agree with everything he wrote. Nevertheless, speaking as one who did not hear the address, but who has read in preparation for this paper a very large number of articles published within the past few years, there is little indeed in Andrews' article which we may currently afford to ignore. This article furnishes us with a very excellent example of the present trend. It is a sincere effort to apply the principles of physiological research to our problems. No surgeon would have delivered such an address even ten years ago; and no internist would have understood him if he did. This reflects the growing enlistment of the physiologist into a direct relationship with applied surgery and medicine. Pathologists had already made that alignment at the beginning of this century.

To those who would desire or need to delve deeply into this physiological approach I would respectfully suggest the reading of certain articles which to me have been most enlightening. Individual reference and acknowledgment to them is impossible, but a list of publications is appended.[§]

It must on occasion occur to us when a speaker ventures a subject as general and evasive as mine, "Why does he not simply state his

attitude or convictions and let the listener compare them with his own?" It is this time-conserving aphoristic expedient which I shall venture to adopt. Our individual isolated experiences are not to be despised, but we must recall with Francis Bacon that they "may be fallacious"; and group experience in gall tract surgery, viewed over a twenty-year period, convinces me that early operation upon doubtfully diseased gallbladders often leads to trouble; and, at the other end of the scale, the late sequelæ, involving the liver and the pancreas and their respective ducts, with or without chronic sustained jaundice ("the dramatic SOS of the liver distraught") are a combined medical and surgical problem. Helpful surgery may be too long delayed. These factors are the therapeutic determinants rather than any "a priori" fixed routine. Great advances, indeed, are being made. Surgeons, anesthetists, nurses and personnel are becoming physiologically minded and simple expedients to promote and conserve liver function are the rule.* The liver, plentifully supplied with water and glycogen reserves and not encumbered by fat, means everything to a patient whether he is to be operated upon or not; and the age-old query, "How is your liver?" is eminently mundane. It is quite beyond the scope and needs of my presentation to discuss seriatim what scores of articles in our journals so ably attest. Permit me rather to put down in summary what I hold to be logical and judicious deductions, gleaned from both current literature and thirty years of clinical experience:

1. Testimony rapidly accumulates to show that ultimate gall tract pathology begins with some systemic physiological metabolic perversion. Therefore, the surgical inference that the gallbladder is vestigial and comparable to the appendix, and that primary infection in it, as in the appendix, carries its own extirpation indictment, has almost nothing to sustain it.

2. Early cholecystectomy does not "ablate the disease." The systemic process, the active stage of their "physiological perversion," whatever it is, still continues. These patients may well be young; they may not have yet accommodated

[‡]Andrews, Edmund: Pathogenesis of Gall Bladder Disease, Minn. Med., 1903, p. 131 (March) 1936. Chicago has become a very active center for physiological research. Prof. A. J. Carlson has led the way, and able professors, working with his pupil, Ivy, have been most effective in introducing physiology to clinical medicine. Epoch making indeed is the masterful development in Rochester, where Dr. F. C. Mann and his associates Essex, Bollman and the many surgeons who have cooperated, have added immeasurably to our knowledge and understanding.

[§]See list of appended articles.

*Witness the care with which all abdominal surgical patients are safeguarded by maintaining satisfactory glycogen stores, the oxygen carrying power of the blood, water balance and osmotic equilibrium, etc.

themselves to a "non-functioning gallbladder." Man forages periodically and needs a gallbladder for bile storage and concentration. Fully a pint a day normally jets by Oddi's sphincter and the body needs bile. We need to become as familiar with this sphincter as with the pylorus, the cardia and the ureterovesical junction, because all are under similar nervous control; and the fact of great anatomical subtlety involved in no way justifies ignoring the issue, simply because, as yet, the complicated dyskinesics evade our comprehension.

3. Stasis is a major issue in the dyskinesics involved. Whether we shall ultimately come to a greater use of the "Lyon-Meltzer technique" for gall tract drainage via duodenal lavage, is a question each careful clinician must answer for himself. The Graham-Cole gallbladder visualization has taught us one definite principle: certain fatty foods do empty a functioning gallbladder. This explains the conviction of the laity that olive oil may be a helpful remedy. Frequent feedings promote bile flow. The avoidance of meals is a poor idea for anyone, even if obese. Perhaps if pregnant women† could be enabled to eat five small meals a day, fewer parturients, whether "fair or not, might harbor stones when 'forty.'"

4. Cholecystectomy versus cholecystostomy, like the tariff, seems to be a local rather than a national issue. Simple drainage should not come into consideration at all except in later ages and disease stages, where the patient's debility or associated liver, pancreas and common duct conditions dictate how much shall be done. I introduce the item here because "early cholecystectomy" has led to technical sequelæ that have invited much condemnation for the operation. I refer to the disasters that follow where aberrant ducts leak; where, without introducing surgical drains, bile seepage from the cystic duct causes general chemical (bile) peritonitis or local massive adhesions; where with adequate drainage extraordinary serosal agglutinations form and later plague; and, of course, the culminating curse of a damaged or severed com-

mon duct. All these potential risks may be ignored "if the punishment fits the crime."‡

5. How severe is the crime and how shall we measure the punishment? Unlike appendiceal disease, the question of surgical emergencies rarely arises in gall tract disease. We have plenty of time to think it over, and possibly try other means for relief, even though at this time a certain amount of apology is called for in the so-called "medical treatment." We may well begin the discussion with decisive attention to a study of the type, the distribution, degree and extensions of abdominal pain. We may readily pass over the classical critical types of colic and admit that not infrequently they are "diagnostic," even sufficient to cause judicious clinicians to ignore roentgen negativity. The converse gets us into trouble. The roentgen evidence is made to supersede all else. A comparable situation has arisen in the matter of the diagnosis and treatment of peptic ulcer. Roentgen duodenal defects (largely because they are objective) override all else, and it is assumed that this finding needs no qualification nor adjustment in terms of the patient's complaint, habitus§ or demeanor. Gastro-enterostomy is still a fine operation and it has a decisive place in surgery; but many patients with duodenal defects due to ulcer have other situations to account for their complaints.

6. This leads directly to an analysis of colic; and stones have too long been held to be the sole and direct precipitating cause. The literature is very engaging in terms of when and how they form; it should be critically read as a basis for our understanding and the directing of therapeutic regimen. Andrews holds that silent gallstones should be left alone; with this I heartily agree. Large, fixed stones seem, indeed, to give few symptoms. The smaller the stones and the more normal the gallbladder musculature remains, the more decisive the colics and the more necessary it is at operation to consider the state of the cystic and common ducts. Not many

†I refer here to the comments made many years ago by Dr. Charles H. Mayo and taken from the "Mikado," and still an invaluable criterion upon which to choose for surgery certain patients with gall tract dysfunction.

§Recently Harvard's Hooton (anthropologist of note) kindly but cynically remarked to a group of doctors that they should go back, not to the dead house, but to the cradle, for the answer to many problems.

Hooton, E. A.: *An Anthropologist Looks at Medicine*. Science: 83 (March 20, '36).

†Potter, M. G.: Observation of the Gall Bladder and Bile during Pregnancy. A. M. A., Vol. 106, No. 13, March 28, 1936. Actual observation on 390 normal women, showed "75 per cent with large, atonic, globular, distended gall bladders . . ." "Frequent failure of visualization of gall bladder during pregnancy."

surgeons will agree with Lahey that the common duct in the presence of bladder stones should be routinely opened; nevertheless, we have seen at secondary operations after cholecystectomy for stone, as well as in a large autopsy service, a relatively large number of instances where either stone in the common duct has been overlooked, had formed subsequently, or in either instance had interfered with drainage into the duodenum sufficiently to produce moderate or gross dilatation of the common duct. It is still a moot question whether this sort of dilatation may occur in man, as it is said to occur in cholecystectomized dogs, as a compensatory effort to create a basin for bile storage. Likewise mooted is the question as to whether disturbed enervation can produce this tangible and obvious situation, so troublesome to the patient. Drainage of the common duct where needed requires cautious and exact technique, but there is no doubt that it should be much more commonly done.

7. It seems an unwise provision of Nature that a secretion so necessary as that of the pancreas should be poured into the intestine in such direct association with the biliary system. No doubt the close association of these secretions, as well as their admixture, is purposeful. No better anatomical study of the relationship between gall tract disease on the one hand and disturbance of the pancreas on the other has been made than that of Dr. Angus Cameron and John Noble.* Bile refluxing into the pancreas through the duct of Wirsung activates trypsinogen, and so-called acute pancreatitis is the result. Extremely acute "gallbladder attacks" are apt to have a pancreatic increment, where it is very valuable to have a gallbladder left wherewith to drain.

8. There is much in Andrews' interpretation of acute gallbladders in terms of a chemical reaction rather than one of primary infection. Not uncommonly are seen tender epigastric masses,† indubitably enlarged gallbladders, which we see disappear and clear up without surgical intervention. This does not mean that one

should stand idly by and allow a very few gallbladders to perforate or to take the life of the patient by indirection, and no doubt simple drainage is occasionally imperative. The point is that the rapid disappearance of the acute phenomenon is consonant with edema (enormous dilatation of lymphatics, exudation or hemorrhage) rather than the typical sequence of bacterial infection.

9. Acute painless jaundice should direct our attention to the liver rather than its ducts. Slow, painless jaundice, which mounts and remains, should make us aware of probable obstruction. Liver function tests are too numerous to intimate that any are satisfactory. What we are after is to attempt to decide in the matter of obstruction whether our patient has one of four things: (a) obstruction from the stone, (b) from cancer in the ampulla or head of the pancreas, (c) from liver cell insult and resultant cirrhosis, or (d) in a patient previously operated upon, a common duct stricture. The problem is very difficult. We believe, after a rather limited use of the method at the Duluth Clinic, that Cecil Watson's‡ method of quantitative urobilinogen estimations of the total stool and daily urine yields direct and convincing evidence of not only what the liver is capable of screening out of the blood, but what passes the sphincter of Oddi as well. This test may be criticized because of its complexity and need of meticulous laboratory detail, but what is the use of a lot of so-called tests if the interpretation is confusing and the results no more conclusive than one's clinical judgment?

10. In this grouping a, b and d types of jaundice call for surgical exploration as soon as chronicity and persistence are established. The results may not be curative, but in a few cases a hidden obstructing common duct stone may be removed; theoretically at least an ampullar or duodenal wall carcinoma may be susceptible to excision. Where it is possible, a remaining gallbladder, to short circuit to the stomach or duodenum, may be extremely comforting. The bile is conserved for the body and an harassed liver allowed to function. Occasionally such a short circuiting may enable a pancreas head that feels like cancer to regress. In any case, we

*Cameron, Angus L., and Noble, John F.: Reflux of Bile up the Duct of Wirsung Caused by an Impacted Biliary Calculus. *J. A. M. A.*, May 3, 1924, Vol. 82, pp. 1410-1414.

†I recall such an instance, with massive tumor, occurring in a gifted and astute surgeon. For a few days he was indeed ill; then the whole mass disappeared, and with it his discomfort. This good man, who would be willing indeed to extract the ordinary individual's gallbladder, was thereafter even averse to having his own tested!

‡Watson, Cecil J.: Abstr. Jaundice, *Univ. of Minn. Hosp. Staff Proceedings*, Vol. 6, No. 28, 262-270, May 16, 1935.

shall view the entire matter in its broadest and correlative light.

This is a plea, not so much for less gall tract surgery, but that which is better chosen, based upon a physiological viewpoint. No evangelistic movement is advised to lessen the ravages of gall tract disease. We may say the condition is not directly transmissible from man to man—unless we assume that habits of drinking and eating arise, for example, among those who prefer to follow rather than to lead. The occasional “light fingered” surgeon is advised to keep in touch and step with his conservative fellows. Tucker has recently stated the issue very well and forcefully.† It should not be necessary for each novice to take chances with a considerable series of trusting and hopeful humans in order that he may attain to wisdom.

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MYXEDEMA—ITS NERVOUS AND MENTAL MANIFESTATIONS*

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Saint Paul

MYXEDEMA, although a time-worn subject, continues to be of interest from many clinical angles, the more so since the recent introduction of artificial hypothyroidism as a form of therapeutics. Furthermore, it is a worthwhile disease to reconsider, not only for the reason that we possess a cure, but also because of the lamentable fact that many patients are forced to see numerous physicians before a correct diagnosis is established. The main reason for this is that the possibility of this disease has simply slipped the mind of the physician. Occasionally, however, mental and nervous manifestations will dominate the clinical picture and at times make the diagnosis difficult.

Every case of uncomplicated myxedema presents a mental state the essential features of which are fatigability and psychomotor retardation. On account of this retardation it takes time and patience to obtain a correct history. Often more valuable information is derived from relatives or friends who have observed the slow metamorphosing of an alert, normal individual

into one who is fat, slow, “toad-like,” lazy, placid and indifferent. Sensitivity to cold, easy fatigability, various aches and pains, loss of initiative, difficulty in concentration, progressive loss of memory, difficulty in making decisions, apathy, somnolence, listlessness, slow, monotonous and occasionally hoarse speech are customary and conspicuous symptoms of myxedema. These features, combined with the non-pitting edema, the swollen, stupid expression, the dry, coarse skin, and slow, clumsy gait constitute a picture when once seen is thereafter easily recognized. This situation is illustrated in the following case of Dr. F. A. Thompson’s of Saint Paul, who had made the diagnosis, and knowing my interest in myxedema invited me to see the patient and has kindly allowed me to report the mental and general physical findings. The cardio-vascular features of this case will be reported elsewhere by Dr. Thompson.

Case 1.—Mrs. W., aged fifty-four, is a married woman whose past and family history are essentially negative.

Her ill health began in 1927 with loss of strength

*Read before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 6, 1936.

which exhibited itself by her becoming easily tired and having weak spells, off and on. She developed pain in the right leg and a physician diagnosed it as sciatica. She subsequently was operated upon for varicose veins. She noticed that she became sensitive to cold, until finally she was always chilly, so much so that even when she used more covers and kept the house at 90 degrees she was still chilly. Her weight increased approximately thirty to forty pounds. Her face and eyes were puffed; her hands and feet became swollen and her skin dry and rough; her tongue became large and thick; her hair became dry and much of it fell out; she had shortness of breath; she felt discouraged and depressed and cried easily; she became weaker and "it was awful hard to do things." She finally could not do her housework. Her memory became progressively worse. She would be talking and would forget what she was talking about. She would become confused in her choice of words. This became so noticeable that her grandchildren teased her about it. She slept a lot. In addition, her gait became clumsy. She would wander off and get lost a few blocks from home. On a few occasions she fell down and had to be picked up and brought home. On walking, she had the sensation of going down hill. Her main activity finally became what she described as "sitting and thinking," but she could not remember what she was thinking about.

This clinical picture developed slowly and reached its height about two and one-half years ago. She was treated for anemia at intervals during this time.

In 1934, Dr. Thompson saw her, diagnosed the condition, and prescribed appropriate thyroid therapy. In addition to the findings of myxedema she had a minus 27 B.M.R. and a typical heart condition, which Dr. Thompson will report in detail. She made a prompt improvement and final recovery. Last summer she discontinued thyroid for three months. She gained ten pounds, her face began to puff, her throat became dry, she began to be retarded and she said she began again to "sit and think."

In considering the mental states accompanying myxedema, two considerations must be borne in mind. First, that psychic manifestations may exhibit themselves before the classical physical appearance has been established. Second, the mental symptoms and reactions may be mild, but on the other hand they may be so severe that a physical examination may be difficult and a B.M.R. almost impossible. Unless these possibilities are understood, this condition may be mistaken for mental derangements varying from neurasthenia to severe types of psychosis, such as mania, melancholia, and schizophrenic reactions characterized by delusions of persecution and hallucinations. Also in elderly patients with arterio-sclerosis the impaired cerebral circulation may be further augmented by the myxedema,

thereby giving rise to symptoms simulating definite organic neurological conditions, such as brain tumor, hemiplegia, etc. It is, therefore, pertinent to determine, if possible, whether the situation is secondary to thyroid insufficiency, or merely a coincidental concomitant. Cases have been reported in which a psychosis of a schizophrenic pattern has seemingly been initiated by myxedema, and in whom thyroid cured the myxedema, but not the psychosis. The first criterion, therefore, in the diagnosis is to establish the fact that a myxedema is really present. This can only be done when definite physical signs are found in combination with a lowered B.M.R. Means and Lerman have shown that myxedematous symptoms do not appear until the B.M.R. approaches minus 30, although the converse is not true. The next step is attempting to eliminate the condition by thyroid therapy. If the mental symptoms are part of the myxedema, improvement and relief should be obtained by the establishing of a normal B.M.R. for a reasonable length of time.

The psychic manifestations in myxedema are varied in character and degree. So far no definite type of psychosis has been established. To the fundamental sluggishness of thought may be added symptoms depending upon the degree and extent of the thyroid insufficiency, the inherent mental and constitutional elements, and the personality reactions of the patient. In addition to these important biological factors, environmental stresses and strains incidental to modern everyday existence often contributes definite influences to the shaping of the mental picture. For these reasons people are not alike in their reactions to depression of thyroid function. Irritability, confusion, depression, clouding of consciousness, and excitement are common features. Delirium with vivid visual hallucinations, delusions of persecution, convulsions, stupor, and apparent dementia are the severe forms often reported. The predominant type found in the literature seems to be that of a confused excitatory one which progresses to delirium with visual hallucinations and unsystematized delusions of persecution. Wagner Von Jauregg, according to Ake-latis, believed that in all cases in which the myxedema was not treated the psychic disturbances finally developed into a confused hallucinatory state or dementia.

The following case showed myxedema accom-

panied by mental sluggishness, episodes of excitement, confusion and feelings of resentment:

Case 2.—A woman, aged forty-eight, single, a housekeeper, had a family history and past history which was essentially negative. In 1921, or 1922, she had noticed various aches and pains in her abdomen and lower extremities. Later she complained of tiredness and loss of strength. Her weight increased moderately. Sensitivity to cold had been present for the past two years. Her memory for recent events diminished and concentration became difficult. These symptoms gradually progressed until the winter of 1925, when spells of confusion accompanied by excitement appeared. In March, 1926, she had reached a state in which it was very difficult to do her work. She had spells of confusion. Her memory had been so bad at times that it was noticed that she forgot where she placed her comb while combing her hair. The situation was climaxed one night by a spell of excitement, during which she had to be forcibly restrained and was controlled with difficulty, and she was considered by her relatives and physician to be suffering from hysteria. At this time she came under the care of the late Dr. Arthur Sweeney and myself and was removed to our Convalescent Hospital.

We found her confused, mildly excited and resentful towards her brother for his attitude towards her. She had no hallucinations or delusions, and she was oriented as to time and place. She became very apathetic and listless soon after admittance. On examination, non-pitting edema of the face, hands and lower extremities was found. The skin was dry, scaly, and had a leathery feel. The hair was sparse. Her expression was rather stupid. Mentally, she was very sluggish. Her concentration was poor. Her speech was slow.

On account of the mental sluggishness and retardation, the non-pitting edema, the dry, coarse skin, and the general picture of a moderate myxedema, desiccated thyroid in one grain doses was administered three times a day. She made a prompt improvement. Within a short time she became alert, the edema disappeared, her weight decreased and she returned home in three weeks. She has remained well, except for a mild return of her former symptoms, in 1929, on discontinuance of thyroid. She finally was taking only one-half to one grain daily. She was last seen by one of us in 1930, but is known to be in good health.

Extraneous and environmental influences which help shape, complicate and precipitate a mental upset in a case of hypothyroidism showing beginning symptoms of myxedema is illustrated in the following example:

Case 3.—A married woman, aged twenty-eight, was admitted to the psychiatric ward at the Ancker Hospital, February 29, 1936, with a diagnosis of melancholia. She had been seen five times in the Out-Patient Department since January 7, 1936, complaining of bloat-

ing, epigastric pains after eating, nausea after meals, irregular and scanty menstrual periods since the summer of 1935, and an amenorrhea since November.

At the hospital, the following history was finally obtained. Her past history was essentially negative until three years ago. She was a stenographer and was married at the age of twenty-one. She was an outward type of person, worried occasionally over financial matters, was the dominant influence of the home, ruled her husband with an iron hand, and was active and energetic. Three years ago she developed pains in the lower abdomen. The sexual act became painful, and her libido decreased. In October, 1934, the right ovary, tube and appendix were removed. Soon after this she noticed her voice was becoming lower pitched. Her marital trouble had gone from bad to worse until, in May, 1935, she separated from her husband on account of infidelity and drink on his part. During the summer of 1935 her strength diminished, and she said she had no "pep." In addition, she was depressed. She had excessive flowing in September and October, and twice in November, and no periods after that. During the fall, her strength diminished, her depression deepened, she was very sensitive to cold, her concentration was poor and her memory was gradually being affected. In December, no period having appeared, she became convinced she was pregnant and she threatened to commit suicide. The idea of pregnancy persisted, she became melancholic and showed increasing mental and physical retardation until admitted to the hospital.

We found that she also had increased in weight during the past four months, especially around the hips and abdomen. Her hands and feet had seemingly increased in size. Puffiness of the face had developed. Her skin had become dry. She also complained of pain in the left lower quadrant and epigastrium with no particular reference to meals.

On examination we found she responded slowly to questions. Her mental reactions were retarded. She appeared very dejected, meek and melancholic. She was somewhat confused and seemed rather in a daze. She was certain that she was pregnant, even after three examinations by a consultant gynecologist, who found no signs of pregnancy. Her concentration was poor, and she was apathetic and listless.

Physically, her face and eyes were puffed, giving her a moderately swollen, stupid expression. The skin was slightly yellowish in color and was dry and coarse. There was non-pitting edema of the hands and lower extremities. Tenderness was present in the left lower quadrant of the abdomen. Her blood pressure was 94/50; pulse 68.

The general physical and neurologic examination otherwise was negative.

The laboratory findings were:

Basal metabolic rate: March 8, minus 31 per cent; March 10, minus 37 per cent; March 19, minus 21 per cent; April 14, minus 19 per cent; and April 21, minus 4 per cent.

Urine: Normal.

Spinal Fluid: Normal; Wassermann negative.

Blood: Hgb. 80; w.b.c. 6800. Differential count normal; sedimentation, 7 mm. for one hour; blood Wassermann negative; blood sugar, 95 mmg. per 100 c.c.; blood calcium, 10.8 mg. per 100 c.c.

Cervical smears, negative.

X-ray: Barium enema revealed a normal colon. Gastric and duodenal studies were negative. X-ray of the skull gave negative findings.

A diagnosis of hypothyroidism with myxedema, amenorrhea and marked depression was made.

Course: The patient was placed on one grain of desiccated thyroid and ten grains of calcium lactate, three times a day. She immediately noticed a disappearance of her chilly feelings, her mental reactions became quicker, the edema gradually disappeared, and her weight diminished from 125 to 120 pounds in ten days.

After taking thyroid for about two weeks it had to be discontinued for a few days on account of headache and vertigo. Her metabolic rate rose from minus 37 to minus 21. Her depression quickly disappeared and she felt entirely different mentally. Her voice regained its former pitch. Her appearance has changed from a melancholic, expressionless, dull looking person to an alert, wide-awake woman. She has finally become convinced that she was not pregnant. Her periods have not returned. She finally admitted that, on a few occasions, she had been exposed to the possibility of pregnancy sometime in August or September. The mental picture, therefore, was definitely shaped and augmented by dynamic emotional factors. Her basal metabolic rate is now minus 4, all signs of myxedema, both physical and mental, have disappeared and no depression remains.

Case 4.—An unmarried woman, fifty years old, was admitted January 31, 1936, to the Nervous and Mental Service of Ancker Hospital for observation. She had attended the Out-Patient Department off and on since July, 1934, for a variety of complaints and symptoms. Her diagnosis was hypopituitarism and hypothyroidism.

The essentials of her past history are the following: She never has had a menstrual period, nor has there ever been any axillary or pubic hair. She grew very little until she was eighteen years old, at which time she was three feet, ten inches tall. From that time until she was twenty-eight she attained a height of five feet, one inch. She went as far as the eighth grade in school and always learned quite easily. She has always tolerated cold weather poorly. For the past ten years she has noticed an increased tendency for her skin to be wrinkled and dry.

Her family history is essentially negative. No similar condition exists in her family as far as she knows.

On June 11, 1935, her complaints were listed as palpitation, edema of the ankles and shortness of breath. On examination the following positive findings were recorded: Skin is wrinkled, thickened and there

is rather marked puffiness about the eyes. No secondary sex characteristics. Tongue is thickened. Breast is infantile type. Heart slightly enlarged, tones distant, no murmurs, regular rhythm. There is a marked venous congestion of chest and thighs. Abdomen showed liver two fingers below costal margin. Genitalia showed no pubic hair, infantile labia, vagina would not admit one finger. Extremities showed puffiness of hands and feet. Non-pitting edema. Blood pressure was 102/60; pulse, 64; weight, 103; B.M.R. minus, 39. Blood—Hgb. 63; r.b.c. 3,520,000; w.b.c. 6700.

She made numerous visits until November 16, 1935. Pituitary whole gland extract, digitonin, ammonium chlorid and occasional small doses of thyroid were given.

She was not seen from November 16, 1935, until January 31, 1936, when she was admitted to the Nervous and Mental Service on account of being apparently psychotic.

On examination we noted the following: She was well nourished, but poorly developed. The hair was fine and very dry. Eyebrows and lashes were sparse. The skin was dry and leathery. There was puffiness of the face and eyes. There was a yellowish color of the skin over the malar prominences. The nose and lips were thickened. The tongue was very large and thickened. Eye grounds showed definite evidence of arterio-sclerosis. The thyroid gland was not palpable. Heart tones were distant. Abdomen was normal and liver was not palpable. Her breasts were not developed. There was no axillary or pubic hair. The labia were infantile in type. Vaginal orifice does not admit one finger. The extremities showed puffiness of hands and feet, more marked around the ankles. This swelling was non-pitting. The skin of the extremities was very dry and coarse.

Mentally she was disturbed because she thought she was being watched, that people were talking about her, that someone would harm her, that everyone noticed her. She knew that she was not quite normal and it was on account of this that she was being persecuted. Her mental reactions were retarded. She spoke slowly and seemed to have great difficulty in concentrating. Her delusions were not systematized. There was definite mental confusion, but she was oriented as to time and place.

The laboratory findings were as follows:

The basal metabolic rate was: June 11, 1935, minus 39; February 6, 1936, minus 20; February 24, 1936, minus 18.

Urine: Normal.

Blood: (2-14-36) Hgb. 78; r.b.c. 4,200,000; w.b.c. 6700; blood Wassermann negative.

X-ray of skull was normal. X-ray of chest showed normal heart and lungs.

Electrocardiogram showed flattening of T waves in lead 1 and 2.

A diagnosis was made of myxedema with a pluri-glandular disorder involving, mainly, the pituitary and thyroid.

Course: The patient was immediately placed on one grain of desiccated thyroid three times a day. She promptly became alert and improved mentally so that within a few days the ideas of persecution disappeared. The dose of thyroid was doubled, but this caused her to be nervous and dizzy.

She was discharged on February 29, 1936, and ordered to take two grains of thyroid daily. She was seen in the Out-Patient Department, March 24, 1936, and April 23, 1936. She is now working as an assistant bookbinder and is well.

Conclusions

1. Mental and nervous manifestations in myxedema consist of mental retardation plus a variety of symptoms depending on the degree and duration of thyroid insufficiency and individual characteristics and reactions.

2. These symptoms may occur before the classical appearance of myxedema has fully developed and has thereby dominated the clinical picture.

THE CLINICAL IMPORTANCE OF HYPOTHYROIDISM

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DUE to the recent advancements in knowledge regarding the glands of internal secretion, it would seem advisable to once again bring before the practitioner the clinical importance of hypothyroidism. It is easy to believe that in certain conditions the newly discovered hormones seem to be the medication of choice, and one might be inclined to neglect the activities and functions of the thyroid gland.

Several reasons justify this paper: (1) the ignorance of when and how to prescribe thyroid; (2) its preëminent usefulness when properly prescribed; (3) the fear on the part of some to use this hormone; and (4) the exaggerated warnings concerning the danger in its use. Inexperience in the use of this medication is where the danger lies. Of course it is generally known that thyroid substance is indicated in myxedema, the existence of which, by the way, the physician usually fails to recognize. Hardly another disease can be mentioned wherein such truly miraculous changes can be wrought, and hardly another ailment can be thought of which is so consistently mistaken.

Myxedema fully developed is relatively uncommon but probably less so than is generally supposed and it is altogether likely that many victims are permitted to pursue the natural course of the disease, sometimes unto death, without ever receiving the amazing relief so easily administered. If this be true for outright myxedema, and it is true, how indefinitely more so does it hold true for the more frequent but less characteristic milder grades of hypothyroidism.

Symptoms

Not long ago Lissner and Anderson¹ called attention to the widely differing symptoms and clinical findings in myxedema in women. The patient may not look myxedematous at all and the dominating complaint for which he or she seeks relief may readily lead the consultant astray. Indeed the bothersome symptom may urge the patient to a specialist, an ophthalmologist, otologist, rhinologist, gynecologist, allergist, cardiologist, psychiatrist, dermatologist or gastro-intestinal expert, rather than the internist or general practitioner (not to mention the omnipotent osteopath).

Circulatory Phenomena.—Myxedematous patients complain of tiring easily on relatively slight exertion. Many observers have shown conclusively that dyspnea, orthopnea, fatigue and other signs and symptoms of cardiac disease may dominate the clinical picture and be treated accordingly when the fundamental cause is deficient thyroid secretion.

The term "myxedema heart" was introduced by Zondek in 1918. Fahr¹⁴ in 1925 published the first paper concerning it in this country. The consensus of the best informed opinion stresses a general enlargement of the heart in myxedema. After thyroid medication the size of the heart, in most cases, undergoes a progressive shrinkage, which reaches its maximum as a rule in three to six months.

The electrocardiogram is almost always abnormal, the most constant finding being a flattening or inversion of T waves especially in Lead

II. T inversion is in all three leads and its conversion into upright waves as a consequence of thyroid administration has been reported by Willius and Haines.³¹ Abnormal axis deviation, small P wave, notched and widened QRS complexes are common. On thyroid treatment many of the abnormalities disappear wholly or in part.

The blood pressure is often elevated and systolic and particularly diastolic pressures tend to fall under treatment.

Fahr¹⁴ considers the shape of the myxedema heart unique; all chambers dilate equally which differentiates the contour from the characteristic "sock" shape found in aortic disease and hypertensive heart.

Gastrointestinal Phenomena.—It is hardly to be expected that so commonplace a symptom as constipation should arouse a suspicion of hypothyroidism. Its antithesis, diarrhea, occasionally complicates hyperthyroidism, but stubborn constipation is even more characteristic of inadequate thyroid function, both in children and in adults; and in the former and in women in the late forties and fifties may be sufficiently intractable to warrant the term, obstipation.⁸ This atony of the bowel musculature responds very nicely to thyroid extract.

Digestive disturbances associated with definite subacidity or even achlorhydria are occasionally the result of marked hypothyroidism or myxedema,^{8,21} especially in patients with basal rates below minus twenty. The findings of achlorhydria and pronounced anemia, even with a high color index should not blind one to the suspicion of an underlying thyroid deficiency.²³

Barbour² in a paper on the diathesis of infancy, reports both immediate and permanent relief from such digestive symptoms as vomiting, intestinal colic, flatus and constipation, by doses of $\frac{1}{8}$ or $\frac{1}{4}$ grain desiccated thyroid with or preceding feedings. Infants seem to require relatively larger doses of thyroid than would be estimated on the comparative basis of weight. One should remember also that hypothyroid children may react with considerable toxicity. Frequent loose stools follow overdosing.

Anemia.—A patient whose appearance is not arrestingly hypothyroid may consult the physician because of weakness and weariness. Unless leading questions are asked or minor suggestive signs are noticed, a routine blood count may satisfy both patient and physician by revealing

a moderate anemia, ordinarily of the secondary type. Iron and liver therapy will be instituted, maybe a search for infectious foci undertaken, with never a thought of an underlying deficiency of the thyroid hormone.

Lerman and Means²¹ found anemia more common in myxedematous patients with anacidity than in those showing free acid in the gastric juice in a study of fifty-two cases of myxedema. Their experience leads them to advise the use of iron in addition to thyroid for secondary anemia (hypochromia). The addition of liver is unnecessary in this group.

Arthritis.—It is desirable to investigate the possibility of thyroid underactivity in patients who complain of aching, stiffness, rheumatism, neuralgia, and arthritis. A far greater number of but mildly hypothyroid, somewhat obese, individuals are annoyed by aching limbs or joints.

Sampayo and Morales²⁷ report definite improvement from thyroid extract in acute polyarticular rheumatism, either with or without the use of salicylates. They found that the combined therapy permits much larger doses of thyroid than can be tolerated otherwise.

Gynecologic, Obstetric and Urologic Phenomena.—We must not underestimate the significance of fibroids, polyps, cancer and endometrial hyperplasia, as causes of menorrhagia and metrorrhagia. We must deplore, however, the tendency to ignore hypothyroidism as an important and not infrequent causative factor. This hypothyroid menorrhagia may occur at any age between adolescence and the menopause, but is more frequent at puberty or in the thirties and forties. McCarrison,²⁴ Bell,³ Falta,¹⁵ Verco,²⁹ Crotti,¹⁰ Berkely,⁴ Kern,²⁰ Lisser,²² Isbister,¹⁹ Cooke,⁹ Lisser and Anderson,²³ and Breckinridge⁶ have testified to the gratifying relief of excessive uterine bleeding by administration of thyroid extract, when this symptom has depended on thyroid inadequacy.

Thyroid treatment must be continued indefinitely and dosage controlled by clinical observation and basal metabolic rate determinations.

Some writers have suggested that amenorrhea, frigidity, sterility, habitual abortion or miscarriage, premature labor and death of the fetus may be induced occasionally by thyroid failure, and that the percentage of reported success from thyroid feeding demands further and more general clinical applications.

Eye, Ear, Nose and Throat Phenomena.—Puffiness of the eyelids, especially the lower lids, constitutes one of the most conspicuous and characteristic signs of myxedema.

Weiss and King³⁰ report twenty-six patients with varying degrees of swollen lids and more or less hypothyroidism. Their ages varied from eighteen to fifty-nine years, only four were males, 25 per cent were underweight and 35 per cent overweight. One patient had suffered from severely swollen lids for five years, but had no other complaints, nor were there any other findings except a blood pressure of 210/100 and a basal metabolic rate of minus twenty-six. Under thyroid therapy the blood pressure dropped to 150/80 and the lid swelling vanished.

Pronounced impairment of hearing is by no means uncommon in hypothyroidism and myxedema. A colloidal infiltration of the nasal and Eustachian mucous membranes may account for this.

Giddiness, vertigo sometimes associated with a swimming sensation or with vomiting and loss of consciousness (a Meniere complex), is encountered now and then, Tinnitus aurium is common in the form of buzzing, roaring, whistling or shrieking noises, while such patients sometimes experience even more serious sensory disturbances, as the hearing of voices or the ringing of bells.¹¹

The "saddle-nose" of childhood myxedema should always attract notice in a Caucasian. It bears some resemblance to the nose of congenital lues, achondroplasia, and retrouse, with protruding nostrils.

Baggy nasal mucous membranes produce mouth-breathing, snoring, and snuffles. Similar thickening of the tongue interferes with articulation. Myxedematous infiltration of the larynx results in the deepening of the voice. If the patient happens to be a female the voice acquires a masculine timbre. A laryngologist may be consulted, or the family physician, because of a "protracted cold," such being the interpretation of the chronic hoarseness.

Dermatologic Phenomena.—The patient may comment on the roughness and dryness of the skin and the absence of perspiration due to hypoactivity of the sebaceous and oil glands.

Sensitiveness to cold is highly characteristic of myxedema. An unbearable chilliness of the entire body may be complained of and is

abundantly confirmed by an array of extra clothing. Extra blankets are required at night.

Alopecia is sometimes a consequence of a hypofunctioning thyroid. When such is the case, a remarkable restoration of hair can be produced by thyroid feeding. Lisser²² reported a remarkable example, with "before and after" photographs. This was a man thirty-eight years of age, almost totally bald, with basal rate of minus 45. Usually the eyebrows and eyelashes become sparse, especially in the outer halves.

The nails are often coarse and cracked and show longitudinal grooves and transverse ridges.

The teeth may share in these trophic disturbances. Dental caries are extremely common in hypothyroidism. Delayed eruption of the teeth is a highly characteristic finding in childhood hypothyroidism and is merely another phase of the osseous retardation so typical of this condition.

Psychiatric and Neurologic Phenomena.—Mental torpor is not only evident to the examiner but complained of by the patient who is painfully aware, at least in the early stages, of the increasing difficulty of mental effort. He finds himself forgetful and is annoyed by a progressive loss of memory; he is unable to concentrate as well as formerly; any sustained attempt to thinking, reading, writing or listening is impossible; his attention wanders and the train of thought is lost.

Metabolic and Allergic Phenomena.—Since adult myxedema or hypothyroidism affects an individual whose growth is already complete, an arrest of skeletal development must be confined to pre-adolescent thyroid inadequacy. The degree of dwarfism may be slight or extreme, depending on the age when thyroid failure began and on its severity. A mildly hypothyroid child need not necessarily be short, especially if the deficiency has its onset in late childhood, but an infant with myxedema invariably is. Talbot has shown that the head, chest and abdomen appear disproportionately large to the eye, but that the circumferences are actually close to the normal for the age. The arms are decidedly short and the striking dwarfism of this disease is mostly due to the shortness of the legs and less to the shortness of the trunk as occurs in achondroplastic dwarfism.

Obesity without hypothyroidism is common; hypothyroidism without obesity does occur; but

obesity and hypothyroidism are frequently encountered together. Indeed a moderate degree of corpulence is highly characteristic of inadequate thyroid function. The overweight usually amounts to from 10 to 20 pounds in a child, and from 15 to 35 pounds in an adult. True thyroid adiposity (which, by the way, probably consists mainly of myxedematous infiltration rather than fat) rarely reaches huge proportions. Tremendously fat individuals, 70 to 150 pounds overweight, owe their obesity to other causes than pure thyroid deficiency, although there may be at times a minor hypothyroid component.

The association of diabetes mellitus and myxedema is exceedingly rare. That a complicating hypothyroidism may render insulin less active is reported by Hendry.¹⁷

Allergic states, such as hay fever, vasomotor rhinitis and asthma are occasionally associated with and seemingly dependent on deficient thyroid function.

Thus Shelton²⁸ reports familial hypothyroidism in a family of six, the mother and four children being afflicted. The mother, between sixteen and forty years of age, had suffered mildly from attacks of asthma and quite severely from recurrent hay fever, both of which vanished permanently upon taking thyroid extract. Her basal rate was minus 42 per cent.

Animated controversy continues concerning the merits, demerits, futility, or danger of utilizing thyroid extract in the treatment of nonthyroid obesity. It is probably only fair to state that the most respected opinion denounces its use for this purpose. The purchase of thyroid substance, or preparations containing it, by the laity, without prescription, and without proper medical supervision, should be prohibited by law. But that any properly trained physician should be afraid of it is tantamount to admitting that he is not properly trained, for it is one of the easiest drugs to control, both by clinical observation and laboratory checks.

Laboratory Aids

(a) *The Basal Metabolic Rate* is generally regarded as the "guiding star" of thyroid diagnosis.

Basal rate determinations are rarely practically necessary for the recognition of thyrotoxicosis or hyperthyroidism, but they are of considerably greater value as an important aid in uncovering hypothyroidism. Many times even the experi-

enced clinician will be grateful for a markedly subnormal rate which clinches a diagnosis for him which was but tentatively entertained or perhaps hardly suspected. A more frequent resort to basal rate determinations would not be a waste of the physician's time or the patient's money. The information obtained would not compare unfavorably with that supplied by the customary routine urine examination, blood count, and blood Wassermann.

But let it be added at once that blind acceptance of a basal rate report may lead to serious error. Beware of the spurious accuracy of tests expressed in percentages and decimal points. There are many pitfalls in the actual execution of the test, for although it is achieved by a machine, it is performed on a human being by a human being. The physician must be self-respecting enough of his clinical legs to stand on them firmly, and not be swept off his feet by a laboratory test. If the rate conflicts with his clinical findings and impressions he must discount the test or insist on its repetition.

Many writers have cautioned against attributing all low rates to hypothyroidism. Indeed, Youmans and Riven³² consider the response to thyroid therapy as of even greater importance since the thyroid hormone is almost specific for true hypothyroidism. Blumgarten⁵ calls attention to constitutional asthenics with low basal rates who are often rendered toxic rather than helped by thyroid feeding. Malnutrition, starvation, Addison's disease, hypopituitarism and eunuchoidism, may be associated with a subnormal basal rate often without a secondary hypothyroidism to account for it. Indeed Blumgarten goes so far as to state that basal rates of minus 20 per cent may be found in children between eight and fourteen years of age without evidence of hypothyroidism; and that juvenile exophthalmic goiter may present a conventional normal rate. We may not be inclined to agree entirely with these latter statements, but they appropriately introduce the perplexity of basal standards in children. Basal tests in boys and girls are helpful but not as reliable as in adults.

Perhaps even more surprising is a report by Morris of four patients with definite signs of thyrotoxic circulatory disturbance, whose basal rates ranged from minus 32 to plus 7, with clinical recovery in all from subtotal thyroidectomy.

Despite all these handicaps, reservations, and uncertainties, the basal metabolic rate, properly done and wisely interpreted, remains an immensely valuable aid in diagnosing hypothyroidism, with or without myxedema.

(b) *Roentgenographic Determination of Bone Age*.—Inasmuch as respiration chambers are not generally available for basal metabolism estimations in infants and the ordinary machines cannot be utilized for children under five or six years of age; and, since the standards for older children are not altogether accurate; and lastly, since most infants and many children suffering from myxedema or moderately severe hypothyroidism are mentally deficient and, therefore, unable to cooperate in the performance of a basal test—for all these reasons it is fortunate that another technical procedure is available and of extraordinary usefulness in recognizing preadolescent thyroid deficiency, namely, the determination of osseous age by roentgenograms. One of the most striking evidences of skeletal retardation is seen in the delayed appearance of the various ossification centers and in the late union of the epiphyseal. Dieterle's table of normal order of these centers in the hands was a convenient first step in the skiagraphic diagnosis of childhood myxedema. Engelbach and McMahon¹² deserve especial credit for elaborating this chart to include the entire body. Every roentgenologist and every physician doing his own roentgen-ray work should possess these tables, which include the ages when the ossification centers or bone nuclei normally appear and when the epiphyseal lines normally unite. There is also charted for each age year, the bones of the skeleton which should be filmed.

(c) *The Blood Cholesterol*.—Epstein and Lande,¹³ Hillmann,¹⁸ Mason, Hunt and Hurxthal²⁵ found low cholesterol values in adult hyperthyroidism (average, 130) and high values in adult hypothyroidism (average, 230). The latter writers concluded from their study that cholesterol reflected better the severity of the hypothyroidism and the true clinical condition than does the basic metabolic levels. Cases with low basal rates without clinical myxedema gave normal cholesterol values. Bronstein,⁷ desirous of an additional method of diagnosis and another guide to treatment, applied cholesterol determinations to infants and children. The normal reading for children is 190 plus. In twelve

thyroid deficient children the cholesterol values ranged from 277 to 782. Thyroid therapy definitely lowered the blood cholesterol in these cases, in addition to raising the basal metabolic rate and effecting clinical improvement. He believes that the use of cholesterol as an aid in the diagnosis of childhood hypothyroidism and the regulation of thyroid dosage, offers definite possibilities.

Treatment

At the outset it would seem prudent to state emphatically (though an apology seems in order for something so utterly obvious) that thyroid substance should never be administered to an individual who is already suffering from too much of it. It would appear unnecessary to insert such a warning were it not for the fact that some of the loose thinking and writing on endocrinology during the past twenty years has included the ingenuous, but ridiculous, idea that whenever an endocrine organ gives evidence of illness, its respective extract should be prescribed. This procedure has been fortified by weird pluriglandular mixtures (containing much inert material but usually a little thyroid) with the pleasant fancy that the body will select those ingredients which it needs and reject those of which it has enough or too much—an astounding doctrine! Let anyone beware of administering thyroid to a patient suffering from hyperthyroidism. Thyrotoxicosis demands reduction of thyroid secretion, not addition of thyroid substance.

Many pharmaceutical firms offer excellent preparations of thyroid substance in tablets of various dosage, or in powder form for inclusion in capsules. Some tablets are coated with keratin for the purpose of avoiding any deleterious effect from the gastric juices. That any material advantage accrues from this is dubious since thyroid has always yielded satisfactory response on oral administration. Thyroxin is available and reliable but whether it is to be preferred to the ordinary desiccated thyroid is questionable. Some feel that the former is superior; others claim that the latter is quite as efficacious if not more so. For instance, Rose²⁶ utilizes both, considers their action very similar but sometimes finds it necessary to substitute one for the other to obtain satisfactory results. Helfors¹⁶ found an increase of 1 per cent in the

basal metabolic rate from $\frac{1}{4}$ mg. thyroxin (Henning), 1 mg. thyroxin (Roche), 2 mg. thyroxin (Shering) and 1 tablet thyreodin (Merck).

Mention should be made of one firm's custom of basing its thyroid tabloid dosage in grains of the fresh substance, whereas most American firms label their product in grains of desiccated extract. This of course has nothing to do with the perfectly good potency of either preparation, but it is immensely important to be aware of which brand is prescribed. One grain of the desiccated thyroid is equivalent to approximately 5 grains of the fresh substance. Tiny doses should be used for little children and the desiccated dosage desirable when larger amounts are needed.

It probably makes little difference which brand of thyroid, thyroxin, thyreodin, or thyractin, etc., the physician selects, since all of them are potent, so long as he adheres pretty well to one of them and becomes familiar with its action. There is such a thing in clinical practice as "getting the feel" of a preparation, and from long experience gauging fairly accurately the appropriate dose for a given degree of thyroid deficiency in a particular type of patient.

In commencing thyroid feeding it is prudent to be circumspect, beginning with a relatively small dose such as $\frac{1}{2}$ grain of the desiccated substance once or twice daily. If no untoward symptoms develop after two weeks the amount may be doubled and this same procedure repeated in another two weeks, and so on, depending on the results to be obtained, the reaction of the patient, and the response of the basal metabolic rate.

At first thought one would expect to be guided in estimating the proper dosage by the depth of the basal rate; that is to say, the more subnormal the rate, the larger the dose; but this concept is quite erroneous. Indeed the opposite is more nearly correct. The greater the basal depression and the more profound the myxedema the more delicate the response to thyroid substance.

It is possible by the injection of a single dose of thyroxin, to raise the basal rate 20 or 30 per cent within a few days, but such an abrupt sudden rise produces a terrific upheaval in the patient which is neither pleasant nor necessary. The patient has been vegetating on a low cold plane of vitality, probably for a considerable time, unless the hypothyroid state followed

swiftly after subtotal thyroidectomy. He should be stepped up gradually into the warmer atmosphere, over a period of weeks, and allowed to thaw out.

The following symptoms should excite suspicion of overdosage: nervousness, excitability, irritability, insomnia, excessive perspiration and feeling of heat, palpitation and dyspnea, subjective sensation of pounding and racing heart action, diarrhea, scanty menses or prolonged menstrual intervals, especially if these symptoms are new phenomena, or, having existed before are now materially increased. The appearance of any one of a number of these constitute a signal for decreasing the dose, and still better, discontinuing thyroid entirely for a few days or a week. There is no occasion for alarm on the part of either patient or physician, since the disagreeable symptoms will promptly vanish in three days to a week, unless the toxic state has been permitted to continue for many weeks before a halt was called. After the toxic manifestations have subsided thyroid should be resumed but, of course, at a lower dosage than the amount which provoked the toxic symptoms.

Granted that myxedema or milder hypothyroidism exists and requires treatment, how long must thyroid substance be administered? Again, no single reply is applicable to all cases. But it may be said that the great majority of patients with outspoken adult or childhood myxedema must continue taking thyroid for many years and perhaps for life. In such cases thyroid feeding is supplemental, and only rarely does the patient's gland recuperate sufficiently to function normally without outside assistance. In other words thyroid therapy is not a cure in the sense that its administration for a few weeks or months produces complete recovery.

The so-called "maintenance dose" may not remain the same permanently; the gland may recover somewhat and not continue to require as much assistance; or, on the other hand, some intercurrent infection or complication (as in diabetes mellitus) may strain its function still further necessitating additional dosage. For the above reasons it is wise to keep an occasional eye on the patient and not discharge him permanently.

Finally, in the present state of the public apprehensiveness regarding thyroid, the physician must be prepared to expect blame for almost

any symptom which appears while the patient is taking thyroid. Utilizing the art of practice he will accept this situation calmly and compromise with the patient by reducing the dose or omitting thyroid entirely for a week in order that the patient and physician may satisfy themselves as to whether the complaint is or is not ascribable to the thyroid substance. Occasionally he may be surprised to find that it is.

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GASTROSCOPY, ANOTHER METHOD OF EXAMINING THE STOMACH*

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THE examination of the stomach for the purpose of diagnosis has been carried out in various ways. The earliest method, that of palpation and inspection of the abdomen, although it undoubtedly aids at times, is of very little value in the early diagnosis of gastric lesions. By the time that a lesion of the stomach is demonstrated by inspection or palpation, it is large and far advanced. The diagnosis of carcinoma by this method is practically always too late to allow any effective therapy. This method was later supplemented by the stomach tube through which specimens of gastric contents could be removed for analysis. The presence or absence, increase or decrease, of free HCl acid may aid in making a diagnosis but we all know that this method is

unreliable. We have all seen carcinomas with abundant free HCl and ulcers with no free HCl. The presence of coffee colored material often aids in the diagnosis of carcinoma but this also usually indicates far advanced lesions. The same may be said for the other chemical tests on the gastric juice. To be sure, this method is of great value in the diagnosis of obstructive lesions in the stomach but these make up only a small percentage of gastric lesions.

The advent of the x-ray with the bismuth or barium meal marked a great step forward in the diagnosis of gastric lesions. There is no doubt but that this method is still the most important in the diagnosis of ulcer or carcinoma of the stomach. The x-ray in the hands of a skilled and experienced roentgenologist has a very high percentage of diagnostic accuracy in this field.

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At the present time it is the best single method for the examination of the stomach and can not be supplanted by any other method. However, a new method of direct visualization, gastroscopy, has been recently developed, which method not only aids the x-ray in certain fields of gastric diagnoses, but also actually supersedes it in some fields. It must be stated, however, that gastroscopy can never supplant the x-ray in gastric diagnosis. It merely supplements this method of examination. In certain fields such as gastritis and erosions, gastroscopy is the method of prime importance, for all gastroscopists are agreed that the roentgenologist cannot diagnose these lesions with any degree of accuracy. It is also very probable that earlier diagnoses of carcinoma of the stomach can be made by gastroscopy in certain cases than can be made by the x-ray.

The need for a direct visualization of the stomach was early felt. Direct visualization is the method of the pathologist in diagnosing lesions of the stomach and is on the whole the most accurate. Mikulicz³ in 1881 was able to obtain a view of the stomach through a rigid pipe and at that time he observed the action of the pyloric canal. Since that time various types of gastroscopes have been developed. At the present there are four types of instruments. The first type is the open tube scope as advocated by Chevalier Jackson. This instrument may be used for the removal of foreign bodies in the stomach. I have been informed that Jackson is successful in over 90 per cent of the cases of foreign body in the stomach. Because of the relatively small area of gastric mucosa visualized, this scope is only of limited aid in the diagnosis of gastric lesions. It is the only gastroscope through which biopsies may be made, but again its field is limited because of its small field of vision.

Another method of gastroscopic examination is that of multiple gastroscopic photographs. In this, several small photographs of the gastric mucosa are made in various positions through a scope which does not permit a view of the gastric mucosa with the naked eye. This method is woefully inadequate in that only a small portion of the gastric mucosa is visualized and the photographs obtained are not particularly clear.

There are two other instruments, both of which are in use today and both of which give very clear and fairly complete views of the gas-

tric mucosa. The first and oldest of these is the rigid gastroscope. This instrument consists of a long metal tube with a light at the distal end above which is a prism through which the image is obtained. This image is then transmitted through a series of lenses up the tube to the proximal end. A soft rubber tip is placed at the distal end to guard against injuring the tissues. Both this and the flexible scope are equipped with facilities for inflating the stomach with air. The flexible scope is so made that the lower three-fifths of the scope is flexible with many lenses along the tube so that it may be bent through a considerable angle. There is no doubt but that the flexible scope has a slight advantage in that it is more easily passed and safer in the hands of the unskilled. It has, however, the disadvantage that the flexible tube very easily loses its flexibility and after about forty to fifty examinations it is necessary to send the instrument back to the manufacturer for repairs. These repairs are not only costly but also necessitate much loss of time.

The first question which naturally comes to mind concerns the inconvenience to the patient. Gastroscopy is not a distressing examination for the patient. Both the rigid and flexible scope are passed very easily, in fact much more easily than the ordinary stomach tube. Many of my patients have said that they do not mind the gastroscope (rigid type) but that they don't like the old fashioned stomach tube. There is very little inconvenience to the patient after the scope has been passed. Although some patients, especially those with hypertrophic gastritis, complain of pain when the stomach is distended with air, this sensation disappears as soon as the scope is removed and the patient belches up the air. A few patients will complain of some soreness in the throat the day following examination but this disappears in a day or so. Many of my patients have requested a second and third gastroscopy and very few if any patients refuse a second gastroscopy when permission for such an examination is requested.

As far as the gastroscopist is concerned, the procedure is not difficult. I would much rather pass a gastroscope than a stomach tube. It does not require much training to enable the novice to pass the scope although the interpretation of the appearance of the gastric mucosa requires a

very considerable experience. The differentiation of ulcer or carcinoma as well as the appearance of the various types of gastritis cannot be learned in a short period of time. It requires careful studies of lesions not only with the gastroscope but also with the x-ray and wherever possible by biopsy control. It is only after an extensive experience of this kind that the gastroscopist becomes expert in the differential diagnosis of gastric lesions.

Before any method can be of any great value diagnostically, it must be proven to be without any great element of danger. I believe that today we can truthfully say that gastroscopy is for all practical purposes without danger. Schindler⁴ with his flexible scope has done some 3,000 gastroscopies without a fatality. It is true that last year while trying out a new type of tip for his instrument he perforated three stomachs but this accident has not occurred since nor did it occur before trying out the new tip. Other European gastroscopists report large series of cases without a fatality. The rigid instrument has a higher mortality than the flexible instrument but even with this instrument the mortality is very low. Becker¹ in Bonn reported a series of 600 cases in the 600th of which he perforated a gastric ulcer and the patient died. Henning² reports 1,200 gastroscopies with the rigid instrument without a fatality. He also reports a further series of 1,400 gastroscopies with the flexible scope without an accident. In some 300 gastroscopies I had the misfortune to cause a necrosis in the throat of an old gentleman which lesion resulted in a mediastinitis and death. Having done all three procedures, I feel that gastroscopy carries a lower mortality than esophagoscopy or bronchoscopy.

There are a few absolute contraindications to gastroscopy. One of these is an aneurysm of the aorta. Another is diverticulum or stricture of the esophagus. Carcinoma of the cardia is also a contraindication. Acute inflammation of the esophagus or stomach are also listed as contraindications by most gastroscopists. The indications for gastroscopy are varied according to various authors. Schindler,⁵ the peer of all American gastroscopists, believes that all patients with gastric complaints, and especially those with negative x-ray findings, should be gastroscopied. Using these indications he finds

that 50 per cent of his patients show gastritis in some form, 20 per cent show ulcers, 20 per cent are normal, 7 per cent have carcinomas and 2 per cent benign tumors. Our experience has been quite different from this in that up to now we have concentrated our attention largely on those patients with gastric pathology as demonstrated by x-ray. In this way our statistics show a preponderance of carcinoma and ulcer although some goodly amount of gastritis has passed through our hands. Of late we have turned our attention to those cases with negative x-ray findings and have been able to make some interesting diagnoses that were not possible by x-ray. Personally I am now convinced that Schindler is right in saying that gastroscopy is most useful in those cases with gastric complaints in whom no positive findings are obtained by x-ray or in whom x-ray is not certain as to the nature of a discovered lesion.

Normal Appearance of Stomach

In the normal stomach a fairly complete view of the gastric mucosa can usually be obtained. There are a few small areas, however, that are very difficult to bring into view and very often these areas are not visualized at all. One of these is the small portion of the lesser curvature below the angle, in other words that part of the lesser curvature in the antral canal. Since the gastroscope lies in close proximity to the posterior wall, it is difficult to bring the small part of this wall just next to the gastroscope into view as the lens becomes smeared with secretion when it touches the wall. The cardia is difficult to examine but with perseverance it can be brought into view. The greatest difficulties are the absolute orientation and the interpretation of what is seen.

Normally the gastric mucosa has a pinkish-orange shiny appearance with the rugæ appearing as elevated ridges. Those portions of the mucosa close to the scope appear brighter and more orange, while those farther from the scope appear dusky. The mucosa close to the scope is magnified, while objects further from the prism appear smaller. The stomach wall may be pulsating with the aorta and other large vessels. The stomach moves with respiration so that the gastric mucosa moves back and forth across the field of vision. There is very little peristalsis in the stomach as viewed through the gastroscope.

The reason for this is not clear although some of the explanation may lie in the fact that all patients are given fairly large doses of morphine or codeine and atropine before the examination.

The most common abnormal finding in the stomach is gastritis in one of its various forms. Acute forms of gastritis such as follow the ingestion of chemicals (alcohol, lye, etc.) or which occur either of themselves or in the course of other infectious diseases are not as a rule indications for gastroscopy. Usually the mucosa has a markedly reddened appearance with much mucus and necrotic material covering the mucosa.

"Chronic mucosal catarrh" is the type of gastritis found in conditions of stasis. In other words, it occurs frequently in heart failure, portal obstruction, carcinoma with lymphatic blockage, and, above all, in cases of gastroenterostomy. It is a very common finding in the gastroenterostomized stomach and probably explains some of the unpleasant gastric symptoms which frequently follow this operation. We have had several examples of this in our series and find that a goodly percentage of the post-gastroenterostomy patients with gastric symptoms have this form of gastritis. Once having seen the angry appearance of the mucosa in these cases, one becomes very skeptical of the value of this operation. The mucosa in these cases presents a cyanotic appearance with much necrotic material over its surface. Biopsy of such a lesion occurring in a case of carcinoma of the stomach shows an infiltration into the mucosa of eosinophiles, polymorphonuclears, plasm cells and lymphocytes. These patients have as their main complaint the occurrence of pain coming on usually one to two hours after meals and have frequently been erroneously diagnosed gastro-jejunal ulcer.

Probably the most common form of gastritis is hypertrophic gastritis. This is found in a great many patients with pain, belching and general feeling of discomfort in the epigastric region following meals. It appears that many of the cases usually diagnosed as bowel dysfunction also show this condition of the mucous membrane. For this reason one must be careful in interpreting the symptoms attributed to this lesion. The lesion has, however, one fairly constant symptom. These patients usually complain of pain when the stomach is distended with air. This lesion is easily recognizable. The rugæ are usually more

prominent and are difficult to wipe out with air pressure. The mucosa itself seems to be rough, loses its shiny appearance and is made up of small hillocks with small valleys between them. The mucosa often has a velvety appearance when viewed in profile in contradistinction to the normal smooth, shiny appearance. The pathology consists of an increase of connective tissue so that mucosa and submucosa becomes securely bound together and resulting contraction causes puckering of the surface. There is usually an increase of round cells in the mucosa. The treatment of this form of gastritis is unsatisfactory. Despite vigorous medical treatment and apparent improvement this lesion is prone to recur with the slightest dietary indiscretion. We have seen several interesting examples of this form of gastritis. One of these patients was diagnosed as an extensive carcinoma of the stomach by the roentgenologist because of the marked irregularity and apparent rigidity of the stomach wall. Gastroscopy, however, showed this lesion to be a hypertrophic gastritis with exceptionally large rugæ. On medical treatment the lesion improved markedly so that the x-ray examination revealed an essentially normal stomach although the hypertrophic gastritis could still be seen gastroscopically.

Gastric erosions are not uncommon. They appear as small reddish defects in the gastric mucosa and are usually found on the rugæ. They may be single or multiple and may occur in acute or hypertrophic gastritis. They assume considerable importance in gastric hemorrhage, for after ulcer and carcinoma are excluded, they are a fairly frequent source of bleeding. In several patients with gastric hemorrhage we have been able to demonstrate erosions on gastroscopy and have been able to determine that the blood in the stools disappears when the erosions are healed. Just recently another cause of gastric hemorrhage has come to our attention. Following a hemorrhage for which x-ray could find no cause, the patient was gastroscoped and was found to have varicosities high on the lesser curvature. Esophagoscopy revealed no varices in the esophagus and therefore the varices in the stomach were not merely prolongations of esophageal varices. This lesion is apparently not an uncommon one as we have seen two such cases in our short series.

Chronic atrophic gastritis is seen in such diseases as pernicious anemia and leukemia. In these it is primary in origin but there is an opinion that it may also occur as the end result of a hypertrophic gastritis. Pathologically these cases show atrophy of the glands and thinning of the mucosa which becomes fibrous in nature although the mucosal surface is not broken. Gastroscoically these cases present a smoothed-out appearance and instead of the normal pinkish to orange color, the mucosa takes on a gray green color. The blood vessels are often clearly seen through this thin mucosa.

Specific infections of the stomach are rare and for that reason not much is known about their gastroscopic appearance. No case of active lues of the stomach has been reported in the literature. We have had the opportunity of viewing such a case. The patient, a white female sixty-nine years of age, diagnosed benign ulcer of the stomach by x-ray, was put on medical therapy but did not improve. She was admitted to the hospital and because of lack of both clinical and x-ray improvement, a diagnosis of probable malignancy was made. The patient had a 2+ Kahn reaction on two occasions.

The possibility of lues of the stomach was considered but because of the rarity of this condition, the idea was dismissed. She was gastroscopied and a large, ulcerated lesion with undermined ragged edges and a bleeding grayish base was seen. At the time I made this observation nothing was known about the appearance of lues of the stomach and I believed it was safest to consider the lesion as possibly malignant. To prepare her for operation, she was given potassium iodide followed by neosalvarsan. About two weeks after the institution of this treatment she was again gastroscopied in order that the staff might view a large ulcerating lesion. At this time I was rather perplexed because the lesion now had lost its undermined edges and was no longer bleeding. However, because the significance of this change was not realized, she was explored after another two weeks of antiluetic therapy. At operation the surgeon felt only a boggy indurated area in the stomach. An incision was made into the stomach and the stomach was viewed from the mucosal surface. The area under suspicion appeared thickened but showed no evidence of ulceration. A biopsy of this area

showed definite perivascular infiltration with lymphocytes and plasma cells deep in the submucosa. About one month following the operation the patient was again gastroscopied. At this time the lesion appeared as an indurated discolored area in the stomach wall. The line of incision into the stomach was seen as an elevated ridge. Several months later gastroscopy showed the area to consist of patches of white glistening scar tissue interspersed with pinkish areas. The line of incision into the stomach appeared as a white scar. The luetic area is still rigid and shows no movements such as characterize the normal stomach. Two years later after antiluetic treatment, this patient is free of gastric symptoms.

Benign ulcer of the stomach has a typical appearance. The usual appearance is much like that of the canker sore in the mouth. The margins are fiery red and the center consists of white necrotic material. The ulcer is usually round or oval with smooth edges. In the healing stage the convergence of the rugæ on this lesion can easily be seen. As the ulcer heals the necrotic center sloughs out and is replaced by granulation tissue. The mucosa grows in from the margin and gradually narrows the ulcer down until it disappears. For some time following the area has much more of a fiery red color than the surrounding mucosa. The most characteristic findings for a benign ulcer are therefore the fiery red color of the margins which are smooth and usually not elevated above the wall of the stomach. At times multiple small ulcers are seen in one area of the stomach, but here again each ulcer has the characteristic of a benign ulcer.

The early diagnosis of carcinoma of the stomach is one of the most important problems that confronts the gastroscopist. Any progress in the treatment of carcinoma surgically must depend on the earlier diagnosis of such lesions. There is probably no lesion that gives such a varied appearance gastroscopically. The lesions vary in color from pale white to gray, blue or purple. The lesions are usually very irregular in outline although small lesions may be smooth. The edges are usually raised above the level of the stomach wall. The ulcerations when present are usually irregular and present a dirty, necrotic center. The rugæ usually run up to the beginning of the margins which then raise above the general level

of the stomach. The differential diagnosis between ulcer and carcinoma is as a rule not difficult. Once having acquired enough experience, we have been very successful in diagnosing the nature of these lesions. It is difficult to explain exactly how the differential diagnosis is sometimes made but the operator makes his decision largely on the general appearance much as the dermatologist diagnoses lesions by their general appearance and often cannot give the exact line of reasoning used in arriving at the diagnosis. We have been fortunate enough to have made a diagnosis of carcinoma on a lesion which the pathologist insisted must be benign on gross appearance but microscopic section of which showed carcinoma.

The question naturally arises as to whether the gastroscopist can diagnose carcinoma of the stomach before the x-ray can make such a diagnosis. We have been fortunate to have seen such a case. The patient came to the hospital following a gastric hemorrhage. She had had a previous hemorrhage three months previously. X-ray showed no evidence of any gastric lesion. She was gastroscopied and a lesion was seen on the posterior wall near the greater curvature about one-third the way from the cardia to the pylorus. A complete view of the lesion was not obtained but a diagnosis of a malignancy, possibly a broad

base polyp or possibly the edge of a malignant ulcer was made. This case was again x-rayed and no lesion could be found. At operation an indurated thickened area was felt in this area of the stomach and the stomach was resected to within 5 cm. of the cardia. On opening the resected stomach a lesion approximately 4 cm. in diameter with a small ulcerated area in its center was seen. Grossly the lesion appeared benign to the pathologist but microscopic examination proved the lesion to be malignant. Lesions near the cardia are notoriously difficult to find by the x-ray method. It is here that the gastroscope has its greatest possibilities. Although the region is also difficult to view gastroscopically, perseverance and experience will usually enable the operator to obtain a fairly complete view. On two occasions we have been able to make a diagnosis of probable malignancy at the cardia because the gastroscope met up against a stony hard resistance. In both these cases it was impossible to get the gastroscope into the stomach so that the lesions could not be seen, but both proved to be malignant at autopsy.

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THE USE OF THE FLEXIBLE GASTROSCOPE*

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THE gastroscope is not a new instrument. Visualization of the interior of the stomach has been attempted in various ways, more or less crude, since the first reports of Kussmaul, in 1869, and Mikulicz, in 1879. Because of the extreme danger of the early clumsy tubes and the poor results, nothing much ever came of the method until the second decade of this century. During the '20's many men, mostly in Germany, worked with various types of rigid and semi-

rigid 'scopes. Much important information about the stomach was acquired by Gutzeit, Elsner, Korbisch, Henning, Schindler and others. Anyone working with these 'scopes, or interested in the subject, realized the limitations, disadvantages and even dangers of the rigid types. With the collaboration and technical advice of Wolf of Berlin, Schindler of Munich, finally, in 1932, developed a practical flexible gastroscope. This instrument is simple to introduce, without danger in properly selected cases, and gives excellent sight of practically the entire lumen of the stomach. Furthermore the Wolf-Schindler flexible

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gastroscope, although still manufactured in Germany, is now distributed by a New York instrument and optical concern which is also equipped to make necessary repairs. Thus this safe and practical endoscope now fulfills the diagnostic requirements for the study of gastric disorders long felt by gastroenterologists and internists.

It is my purpose now to outline briefly the functions of the gastroscope in the diagnosis, both direct and differential, of stomach diseases. Let me say, at the outset, that this endoscopic method of investigating the lumen of the stomach has not, nor will it, supplant any other of the various methods now acceptable and used in gastric examination. The direct visualization of the gastric mucosa by the gastroscope is in some cases supplementary and in others complementary to history, physical examination, analysis of gastric secretion, fluoroscopic and radiosopic picturization, or other more indirect methods. In some conditions, as will be noted later, it gives information which can be obtained in no other way; in other instances, it may be confirmatory; in still other cases it may be contradictory. But in any event, like other methods of examining human material, it should find its proper place in the general scheme of a diagnostic program, and the findings revealed thereby be evaluated in the light of all the other data.

Practically any patient in whom the ordinary Ewald tube can be passed, may be gastroscopied. The contraindications are simple, namely, any obstruction, external or internal, of the esophageal lumen from the pharynx to the cardiac orifice, including of course mediastinal tumors, aneurysms, diverticulæ and the like. In some cases of rather extreme, stiff kyphosis, although the scope may be passed into the stomach, angulation is so extreme that a clear vision is impossible. Certain other obvious contraindications such as esophageal varices, angina pectoris, extreme hypertension, exist; and from the standpoint of comfort of the patient, safety of the tube and ease of visualization, a patient with intractable cough from bronchitis or acute upper respiratory infection, or with difficulty in breathing for any reason is an unsatisfactory subject.

The direct indications are, broadly, any case in which it is desirable to get accurate information about the state or condition of the mucosa of the stomach. This includes circulatory changes, inflammatory conditions, ulceration,

hemorrhage, new growths, etc. In some instances as will be seen later, this information can not be obtained precisely in any other way.

The gastroscope often clears up a questionable diagnosis, obscure from history and physical examination or with negative results from chemical and roentgen examination. In some cases the scope, too, reveals a perfectly normal mucosa, turning attention to the necessity of investigating the patient as a functional or psychoneurotic problem. As a matter of fact, these cases are among the most satisfactory; the patient seems to be more convinced by a report based upon direct examination, than by an opinion derived from indirect observation.

Very numerous are the cases with questionable or negative roentgen findings in whom the gastroscope reveals various forms of gastritis. It is not my intention at this time to go into a discussion of gastritis, except to point out that, as revealed by the gastroscope, there *are* changes in the mucosa and probably the submucosa of the stomach which must be called gastritis. The exact classification of the various forms, the correlation of the objective endoscopic findings with clinical, histological and roentgen evidences has still to be done. But for the present it must be accepted that inflammation, both acute and chronic, does occur in the stomach; that it may or may not, depending upon its character, give rise to symptoms; and that such changes can be accurately shown only by the gastroscope.

The most important differentiation is between simple, peptic, Cruveilhier type of ulcer of the stomach and ulcerative gastritis. These are two distinct entities, which may have quite similar, even identical, clinical history and findings, and in which roentgen examination may be negative or equivocal. The gastroscope has been the means of clearing up the question of whether gastritis is present as a cause or accompaniment of ulcer. Most gastroscopists (Konjetzny and Korbseh still dissenting) believe, and have stated, that ulcerative gastritis and so-called peptic ulcer are two different, unrelated conditions.

In peptic ulcer, particularly in the more chronic forms with retention, there may often be secondary gastritis; peptic ulcers may also be multiple; and in duodenal ulcer the stomach often shows gastritic changes. But true ulcerative gastritis is a different condition, at least gastroscopically, and, conversely, the type of gastritis

occasionally seen with peptic ulcer is not the type seen in ulcerative gastritis.

Other forms of hypertrophic gastritis, hemorrhagic, erosive, aphthous and the more superficial catarrhal forms, often can not be distinguished clinically and even roentgenologically from ulcer. We have examined cases in which, with a history of gastric upsets, the x-ray report has been ulcer or suspected ulcer and some one of these many forms of gastritis has been found to be the true diagnosis. In many other cases, again with a dyspeptic history, in which the roentgen report has been negative, some form of gastritis has offered a positive diagnosis and explanation of the symptoms. The finding of gastritis instead of ulcer not only gives a guide to medical treatment, but certainly obviates the necessity of considering surgical proceedings at all.

Atrophic gastritis is less likely to produce symptoms, but several interesting cases of such have been seen, in which an acute exudative gastritis was superimposed on an atrophic mucosa.

The diagnosis of early malignancy, or the distinguishing of malignant changes occurring in ulcerative tumors, is, in most cases, accurately made by the gastroscope. It is quite difficult to explain to one who has not looked through a gastroscope just what color changes and differences in texture and depth of mucosa are seen by the gastroscopists. But after repeated observation such differences are easily noted, and the more experienced gastroscopists seldom mistake malignancy. Again the scope may often be used to determine operability. The exact extent of a malignant lesion is often indeterminant by roentgen examination, but the gastroscope allows one to determine, with a high degree of certainty, normal from abnormal stomach wall.

Perhaps the most interesting study in gastroscopy is that made of stomachs which have been operated upon for various reasons. The location, patency and general condition of a gastro-enterostomy is usually easily determined. It is always important to know whether there is a stoma ulcer, a jejunal ulcer, and the exact condition of the mucosa of the stomach. In a general way it may be said that if a gastro-enterostomy is not well placed or is too large or too small, or if it does not contract but remains fixed and open, the stoma itself often and the stomach almost invariably are affected. Gastritis in resected stomachs is not as common, probably because the

type of operation usually done when a lesion must be resected gives more adequate drainage than the usual gastro-enterostomy. The question of recurrence of original malignancy is often difficult to determine in a resected, distorted stomach by x-ray, but is easily answered by the gastroscope.

The progress of the healing of ulcer, or gastritis or the atrophic membrane of pernicious anemia under treatment is beautifully shown by the endoscope. Conversely, the reason that an ulcer does not heal is often found by the scope; such a case is very likely to be one of ulcerative gastritis in the first place and not simple peptic ulcer at all.

The scope may safely be used to localize active and persistent bleeding. Whereas there is some danger attendant upon introducing the gastroscope with its necessary air pressure into a stomach, the site of recent or imminent perforation, there is nothing to fear from such a procedure in the presence of hemorrhage. There is nothing about the examination which would produce serious bleeding nor even aggravate hemorrhage already present; and the advantage in locating an open vessel is obvious.

A few typical instances of the value of gastroscopy may be briefly cited.

Mr. M. feared cancer because of his family history; and, inasmuch as he had lately suffered some epigastric distress, wished examination. Gastroscopy showed no cancer but an atrophic mucosa, facts immediately reassuring to the patient but possibly carrying prognostic implications to the clinician. Several cases of duodenal ulcer showed, according to the roentgenologist, defects suspicious or suggestive of gastric ulcer also. In some of the cases, no lesion at all was found in the stomach; in others, a gastritis not uncommonly accompanying duodenal ulcer.

Mrs. C., a highly neurotic woman with a history of vomiting, repeatedly, had gastric retention of high grade; on at least two occasions there were noted questionable defects at the pylorus on films. Gastroscopy revealed no lesion, but a markedly spastic pylorus and hypertonic antrum region. Other similar cases have been seen in which the distinction between spasm, malignancy and benign hypertrophic pyloric stenosis could not have been made roentgenologically or clinically. In each instance so far examined, the correct diagnosis has been by the gastroscope.

Mr. B. showed by x-ray a large crater on the posterior wall with a wide areola surrounding it, obviously indurated gastric mucosa, and the question of malignancy was properly raised. By the gastroscope a benign ulcer was seen on the anterior wall, the surrounding raised edge being only edema. The entire stomach also was involved in an extreme hypertrophic gastritis with

numerous other ulcers, erosions and hemorrhagic areas.

Mr. T. had been examined on numerous occasions, being given both positive and negative opinions as to presence of gastric ulcer. Gastroscoically he was seen to have extensive erosive gastritis.

Mr. D.'s stomach on x-ray was seen to be pushed to the left, obviously by an enlarged liver; whether it was the site of a primary carcinoma could not be determined. By gastroscope a scirrhus carcinoma involving the distal half of the stomach was seen.

Another man, because of the extremely irritable and hyperactive behavior of his stomach on fluoroscopic examination, was thought to have some lesion; but films failed to reveal any defects. Gastroscoopy showed an active hemorrhagic ulcer, high up just below the esophageal orifice on the anterior wall, a region very difficult to examine by x-ray.

Mr. H. was thought to have multiple tiny ulcers of the posterior wall when examined roentgenologically by relief technic, but gastroscoically a perfectly normal stomach was seen. The explanation of the defects was not apparent except that they may have been caused by very fine rugation which air pressure during endoscopic examination ironed out.

Mr. O. was diagnosed as having duodenal ulcer because of the quite characteristically defective bulb, as seen radioscoically. He had, however no free HCl acid after histamine, and blood smears showed a macrocytic anemia of moderate degree. He was a young man and the diagnosis had to be cleared up. The gastroscope revealed an atrophic gastritis compatible with pernicious anemia. If he had a duodenal ulcer too, it would certainly be a very rare and curious coincidence.

Many other identical or similar instances might be given. The intention is not to discredit other methods of examination for, as a matter of fact, many of the above roentgen diagnoses were made by myself. None of them cited above were roentgen errors or mistakes. All were common appearances which have given rise to question and doubt time and time again. Previously the diagnosis has had to be cleared up or corrected by repetition, exploratory laparotomy, watchful waiting or left honestly doubtful. Now with the gastroscope it may be possible in a good many instances to more quickly and efficiently arrive at a correct diagnosis. On the other hand there are many things shown by the x-ray which can not possibly be seen, or, if seen, not properly evaluated by the gastroscope. In certain patients there are, because of the form and position of the stomach, regions that it is not possible to bring into the gastroscopic field.

There are many patients, for reasons already listed, who should not be gastroscoped. There are others who, for various reasons, cannot be

gastroscoped. Roentgen methods and the gastroscope are not in opposition; it is not a question of the one or the other, but of collaboration. A knowledge of fluoroscopic and roentgen appearances is almost essential to gastroscopic interpretation, and the wider use of gastroscopy should aid an open minded roentgenologist in interpreting many of the pictures he sees.

The difference, as seen by the gastroscope, in the anatomy of the various regions of the stomach, is striking. Just what these differences mean physiologically has not been precisely worked out, but that there must be some functional distinction to correlate with the apparent morphological and anatomical difference is inescapable. The antrum, the pylorus, the body of the stomach and the cardia are quite definitely differentiated. This difference not only helps in orientation at the time of examination, but must have implications of physiological import.

From the foregoing remarks it is evident that gastroscopy should be employed by one sufficiently trained in gastroenterology to be capable of interpreting the pictures observed. It is not simply another endoscopic procedure. The technic of introduction of the scope may be very easily mastered. The interpretation of what is seen is possible only to one who has been sufficiently interested in gastric work to have acquired basic knowledge of normal and abnormal conditions. The instrument is of no use in the recovery of foreign bodies, even if it were important to extract such from the stomach. As yet there is no facility for obtaining biopsies if that will ever be feasible. But for the study of morphological changes in gastric mucosa, the gastroscope is the only instrument as yet devised which gives a true picture of the living stomach in health and disease. As an adjunctive diagnostic method it merits use by internists, surgeons and gastroenterologists interested in making more accurate studies of gastric pathology.

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VARIOUS DRUGS USED TO SUPPLEMENT THE BARBITURATES IN THE PRODUCTION OF OBSTETRIC ANALGESIA AND AMNESIA*

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IT IS a little over a decade ago since the barbiturates first came into use for relieving the pain of labor. Great hopes were raised that a simple and ideal analgesic and amnesic agent had been discovered. It was hoped that the barbituric acid derivatives would prove advantageous substitutes for the hazardous combination of morphine and scopolamine used in "twilight sleep"; for the confusing combinations of ether and quinine in oil given rectally followed by morphine and magnesium sulphate given hypodermically as employed in the Gwathmey technic; for the tedious and costly administration of nitrous oxide inhalations given intermittently over long periods. Advocates of intravenous, intramuscular, rectal and oral administration of barbiturates successively held forth their claims. It soon became apparent, however, that such disadvantages as undue restlessness of parturient patients, uncertainty of results as far as amnesia was concerned and the fairly frequent occurrence of apnea in babies at birth made it desirable to search for other drugs to supplement the barbiturates in their desirable effects and, if possible, to modify or counteract them in their undesirable effects. This search has met with but limited success and is still going on. It is my purpose to consider briefly some of the advantages and disadvantages of the supplementary drugs now most commonly being used.

Before doing so it is necessary to note the recent trends as to the preferred kinds of the barbiturates themselves, the modes of administration, the time of administration and their dosages. Pentobarbital sodium and sodium amytal are the barbiturates most used and most favored. Theoretically, the former acts more quickly than the latter. Practically, sodium amytal given in twice the dosage is just as rapid in its effect. Either of them when given orally or rectally acts fully in twenty to thirty minutes. Pentobarbital sodium is thought to be destroyed more rapidly in the body. This is a debatable

advantage during labor when a prolonged effect usually is desired but it is advantageous on the completion of labor when rapid return to consciousness simplifies nursing care. I have been unable to note any appreciable difference in the duration of action of the two drugs. Most patients under the influence of either of them become conscious and coöperative in four or five hours after the last dose of the drug and before that time a certain number of them are restless and irresponsible. Some of them may even get out of bed if not watched. All of them are safer when side-boards are used on their beds and when alert nursing service is available.

Oral and rectal administration are the most frequent routes, the former for initial administration, the latter for subsequent administration when the effect of the drug is wearing off but when the swallowing reflex is still disturbed so that dangerous aspiration of the drug might result from giving it by mouth. Intravenous administration, while it gives quick relief to the suffering patient, presents certain dangers characteristic of the rapid introduction of a potent drug into the circulation and its routine use practically has been discontinued.

It is being recognized that early administration is advantageous if maximum relief from pain is to be obtained and if restlessness is to be avoided. While many users of barbiturates have advocated withholding medication until the presenting part is deeply engaged and there is 3 or 4 cm. dilatation of the cervix, it is becoming evident that medication should be started as soon as labor is definitely established. Establishment of labor probably should be defined as regular, palpable contractions occurring every five minutes or less and lasting forty-five to sixty seconds. Rosenfield⁸ does not believe that it is necessary to wait for definite engagement or demonstrable dilatation. It has been argued that too early administration of the drug may stop labor. The barbiturates occasionally produce a short lull in labor but rarely, if ever, stop uterine contractions. On the contrary, they fre-

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quently hasten the course of labor because they relieve nervous muscular tension and probably relax the cervix. Randall has urged that the analgesic effect of the drug be kept a little bit ahead of the patient's requirements, thus reducing the incidence and degree of restlessness.

Dosages are higher than formerly, particularly initial dosages. It has been noted that large initial doses are less apt to produce excitement and that they give quicker relief from pain. For pentobarbital sodium, the initial dosage ranges from 4.5 to 7.5 grs. For sodium amytal, twice this dosage, namely 9 to 15 grs. is required to produce the same effect. When the larger initial dosage is contemplated, it may be advantageous to divide it into two portions, preferably 4.5 and 3 grs. of pentobarbital sodium or 9 and 6 grs. of sodium amytal. Administration of the first portion will be followed in fifteen to twenty minutes by the second portion. In this way, individual sensitivity of patients to the drugs may be noted and sometimes the amount of the second portion will be reduced or it even may be omitted. Subsequent dosages are from one-third to one-half of the original amounts and are given usually at three or four hour intervals, although they may be given at intervals as short as one and one-half hours or as long as six hours. Variation in sensitivity to the drug is common and the time of repeating the medication must be judged by the reaction of the individual patient. Total dosages of pentobarbital sodium range from 6 to 12 grs. although 22.5 grs. have been given over a period of thirty-seven and one-half hours by Galloway⁴ without evident ill effects. Total dosages of sodium amytal up to 24 grs. are not unusual or seemingly injurious.

The most frequently used supplementary drug is scopolamine. It is usually given in the form of hyoscine hydrobromide in doses of 1/200 to 1/100 of a grain. The most frequently used dose is 1/150 of a grain. It is given hypodermically with the initial dose of the barbiturate and sometimes is repeated once in the same or a smaller dose. The chief objection to this combination of drugs is the restlessness produced which various reports show to range from 17 to 50 per cent. The wide variation of reported restlessness is somewhat difficult to explain. It may be dependent upon different standards of judging restlessness, but it is more probable that the

higher percentages occur in those series in which smaller doses of the barbiturates are used and when administration of the drug is postponed to the latter part of the first stage. Whatever the explanation, it does indicate that scopolamine does not add to the analgesic effect of the barbiturates, for restlessness, since it usually occurs only during contractions, is an indication of poor analgesia. It necessitates constant nursing care but does not indicate failure of pain relief for over 90 per cent of patients have little or no memory of their labors. While the use of scopolamine with the barbiturates does not prolong labor, neither does it decrease the use of outlet forceps which is frequently resorted to because of the lack of voluntary muscular assistance during the perineal stage of labor. Nor does it reduce the number of apneic babies noted when the barbiturates are used alone. Delay in initial respirations and sluggishness of new-born babies are unavoidably associated with barbiturate medication during labor because the concentration of the drug in the baby's blood is probably the same as in the mother's. Dille³ has shown experimentally that the placenta presents no barrier to the passage of barbiturates into the embryo. Fetal apnea, however, does not increase fetal morbidity and mortality and it usually responds to mild stimulation. Carbon dioxide and oxygen inhalations to the mother before the cord is clamped and to the baby afterwards are particularly valuable. Clearing the baby's throat of mucus with a soft rubber suction bulb and rubbing the back are usually sufficient in the 30 to 40 per cent of babies who do not breathe and cry promptly. Injection of one-half a c.c. of metrazol or coramine into the buttocks or occasionally into the umbilical vein may be indicated when apnea is more marked. Tubbing is rarely necessary. The main rôle of scopolamine as a supplement to the barbiturates is the same as it was with morphine in "twilight sleep," namely to insure amnesia. It is still the "drug of forgetfulness."

Morphine sulphate in doses of $\frac{1}{8}$ to $\frac{1}{6}$ grain has been used with the barbiturate-scopolamine combination to control restlessness. Dilaudid in doses of $\frac{1}{32}$ grain has been used in the same way.¹⁰ Opium derivatives have also been used alone to supplement the barbiturates. They were, in fact, the first drugs considered as supple-

mentary medication. Daichman and Shir² have proven the analgesic effectiveness of morphine by obtaining over 97 per cent of quiet patients when $\frac{1}{8}$ grain of morphine was given with 9 grains of sodium amytal as compared to only 67 per cent of quiet patients in a previous series in which sodium amytal was used alone. Only half of their patients, however, had good or fair amnesia. Twenty-two per cent of the babies were apneic and almost 9 per cent more were asphyxiated. More coöperation from a quiet patient seems to be the main advantage of routine morphine-barbiturate medication. This desirable effect is probably offset by the loss of dependable amnesia and the hazard of asphyxiated babies. The use of morphine in labor has decreased markedly since the introduction of the barbiturates. Many obstetricians now believe that its greatest usefulness lies in its effectiveness when given in full doses to give needed rest during prolonged first stages of labor.

Paraldehyde given rectally in oil is the most recent drug used supplementary to the barbiturates. Rosenfield and Davidoff⁷ reported remarkable success with its use in 1932. Ninety-five per cent of their patients had complete amnesia; only 7 per cent showed marked restlessness and only 11 per cent of the babies were apneic. Colvin and Bartholomew¹ modified their technic somewhat but confirmed their results, even advising the use of the method in home deliveries. Irving and his co-workers,⁵ for some reason or other, were unable to duplicate their results, their series of cases showing only 64 per cent amnesia, while 24 per cent of their patients were restless enough to require restraint and 47 per cent of the babies were apneic. Paraldehyde is usually given after full doses of one of the barbiturates. Initial doses range from 6 to 8 drams and are mixed with equal or larger amounts of olive oil. Subsequent administration may be unnecessary if additional barbiturates are given or may, failing to get relief from barbiturates, be repeated in one-third to one-half of the initial doses as early as three hours later. Rapid rectal injection through a 100 c.c. barrel and plunger syringe connected to a rectal tube inserted six to eight inches in the rectum and this procedure followed by pressure over the anus for ten to thirty minutes are important details of administration preventing expulsion of the mixture.

While the method is less simple than the barbiturate-scopolamine technic, it promises the advantages of increased quietness of mothers and decreased apnea of babies. The importance of repeating the medication as soon as indicated, if one would avoid increased restlessness and diminished amnesia, should be stressed. Total dosages range from 6 to 13 grains of pentabarbital sodium and from 6 to 12 drams of paraldehyde.

Rectal ether in oil in doses of 2 to 4 ounces has been used to supplement barbiturates to a limited extent and with somewhat discouraging results. Various reports note increased asphyxia of babies,⁶ decreased amnesia⁵ and delayed labor.⁹ This combination results in only 5 per cent of restlessness,⁵ however, and it may be that its future usefulness will lie in controlling the marked restlessness too frequently incident to barbiturate-scopolamine medication.

In conclusion, the combination of scopolamine with pentabarbital sodium or sodium amytal offers the fewest disadvantages and presents the least complicated technic. It requires constant nursing care before and for several hours after delivery and seemingly is adaptable only to hospital use.

The supplementing of barbiturates with paraldehyde, while presenting a more complicated technic, should prove valuable in producing obstetric analgesia and amnesia when quietness and coöperation of the patient is important and therefore prove particularly adaptable to home obstetrics.

Morphine has a limited value in augmenting the effect of the barbiturates and should be used judiciously. Rectal ether in oil is valuable for relieving extreme restlessness.

Ideal routine methods of producing obstetric analgesia and amnesia can be approached but probably never achieved. There will always be individual variations of patients, attendants and conditions to which various drugs and technics must be adapted.

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DIAGNOSTIC PROBLEMS IN HEART DISEASE IN CHILDREN AND YOUNG ADULTS*

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NO FIELD of medicine has shown more progress in recent years than that of cardiology. Precise pathological diagnoses can now be made in the living patient even to the point of determining which branch of the coronary artery is involved in a thrombotic process. This advance has been possible through a better understanding of the pathology of heart disease, by long continued follow-up studies, and also by the use of instruments of precision, such as the electrocardiogram and x-ray. This increased efficiency in cardiac diagnoses will, of course, eventually lead to more effective therapy. For the present, however, it can be said that this marked progress has also made all of us heart conscious. The medical profession as well as the public are repeatedly informed that heart disease is now the leading cause of death. Hardly a day passes without a notice in our newspapers that some individual died of a heart attack. A man may die from any other cause but mention is rarely made of it, but if he dies of a heart condition it is sure to be noted. All such publicity leads to apprehension. Every time a prominent person is said to have died of a heart attack, there is an increase in cardiac neurotics to examine. This sort of information also has its effect on children and young adults. Because of this over-emphasis of heart disease, it is most important that our diagnoses be correct lest by our errors we help to produce chronic invalids. There are many functional conditions of the heart which can and should be differentiated from organic heart disease.

During an experience of fourteen years at the Lymanhurst Heart Clinic, a relatively large number of patients have been examined who were found to have no organic heart disease. Some of them had been kept in bed from weeks to months; some were taking digitalis; others were restricted in their activities and had been excluded from gymnasium on the written excuse of their physicians, stating that they had some cardiac disorder. Some were already cardiac neurotics. Such patients are most difficult to deal with and often become chronic invalids in spite of every assurance that their hearts are in fact normal. It is true that in some of these instances, no definite diagnosis of organic cardiac disease was ever made by the doctor in attendance, but mention of a murmur or an irregularity in the heart or a remark such as "a slight leakage which the patient will outgrow," was enough to cause the fear of heart disease.

It is with the hope that some facts of practical value gained from these years of experience may help in avoiding such errors in diagnosis that this report is given.

Since 1922, there have been examined at the Lymanhurst Heart Clinic, 887 patients who were found to have no organic disease of the heart. These patients are divided into four main groups: (1) no heart disease, 677 patients; (2) non-pathologic murmur, 241 patients; (3) extra-systolic arrhythmia, 27 patients; and (4) neuro-circulatory asthenia, 23 patients. Among the 677 patients who were classified as no heart disease, many had systolic murmurs over the pulmonic area, cardio-respiratory murmurs or roughening of the first sound at the apex. Others had marked sinus arrhythmia. In spite of the fact that

*From the Lymanhurst Heart Clinic and Convalescent Home for Rheumatic Children. Convalescent home made possible by WPA grant. Read before the Annual Meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 6, 1936.

some of these patients had previously been diagnosed as suffering from organic heart disease, our findings were so obviously within normal limits that we classified them as having normal hearts.

Non-Pathologic Murmurs

A study of the literature on the subject of the significance of the systolic murmur shows an interesting change of thought in the past century. One hundred years ago, every murmur heard over the heart was considered as evidence of serious heart disease. As more and more post-mortem examinations on patients with systolic murmurs revealed no cardiac pathology, investigators became skeptical of the importance of these murmurs. Mackenzie,⁵ in his well known long continued follow-up studies on private patients, was quite convinced that the systolic murmur was of no importance. He pointed out that he had followed patients as long as forty years with persistent systolic murmurs and at no time was there ever any evidence of cardiac disease. At the beginning of the World War, it was the consensus of the best opinion that the systolic murmur heard over the heart was of little importance and could be almost disregarded. However, in the last ten or fifteen years, a number of articles have appeared which would indicate that the systolic murmur is again coming into its own. It is pointed out now that a careful analysis of every systolic murmur must be made and that a good many of them will eventually be proven to be due to organic disease. Levine⁴ in a recent article has concluded that "systolic murmurs do occur but are not common in normal individuals." White⁷ divided the apical systolic murmur into slight, moderately loud, and very loud, and concluded that "the louder the murmur the greater is the possibility of organic heart disease and the worse the prognosis." Fineberg and Steuer³ recently reported a follow-up study on 100 children with what are termed "uncomplicated apical systolic murmurs" and concluded that 30 per cent of these patients eventually develop serious complications (mitral stenosis, aortic regurgitation, or both). However, a study of their facts indicates that their patients did not have what it is correct to designate as uncomplicated systolic murmurs, since a good many of them gave a definite history of rheumatic fever or chorea and a number already showed some cardiac enlargement by x-ray on the first examination. No

patient with a history of rheumatic fever or chorea can be designated as a patient with an uncomplicated systolic murmur. These patients should be classified as having potential heart disease and must be followed over a number of years before it can be definitely concluded that they have no organic heart disease. Siemsen⁶ in the consideration of non-organic auscultatory cardiac findings points out that it is necessary to consider other factors than the murmur itself in evaluating the importance of any systolic murmur.

Apparently Mackenzie tended to under-rate the importance of the systolic murmur. On the other hand, it is quite apparent that as a result of the more recent studies, the systolic murmur is again being stressed too greatly and is placed in a position far more important than it clinically deserves. As a result of these latest articles and also because of insurance statistics, some of the medical directors of life insurance companies have concluded that for practical purposes there is no such thing as a functional murmur; that all applicants with any kind of heart murmur should either be rated up or rejected. The fact that the insurance figures show a bad experience in regard to systolic murmurs would indicate that these applicants have not been examined carefully; that many of the so-called non-pathological murmurs were, in fact, murmurs of organic heart disease.

Of the 241 patients in our series diagnosed as having non-pathologic murmurs, 231 are included in this study. It should be noted that these patients had definite systolic murmurs and that all patients with merely pulmonic systolic or cardio-respiratory murmurs were not considered in this group but were placed in the group labeled as no heart disease. Of these patients, 120 were males; 111 females. One hundred and forty-nine, or 65 per cent, were examined once, while seventy-four, or 35 per cent, were followed over a varying number of years. Sixty-one patients were followed for less and thirteen for more than five years. One hundred eighty-three had x-ray examinations of the heart and forty-six were re-x-rayed on subsequent examinations. In twenty-five instances, electrocardiographic tracings were taken. The age range of these patients was from three to nineteen years.

Location of Murmur.—One hundred forty-nine of these systolic murmurs were heard at the apex; nineteen over the aortic area; seventy-three along the left border of the sternum; twenty-four patients had hemic murmurs, the so-called "venous hum." In all but six patients, the murmur accompanied but did not replace the first sound. In eighty-four it was noted that the murmur changed with the position of the patient. The x-ray examination of the heart in every instance was within normal limits and all follow up x-ray examinations showed no enlargement or change in contour of the heart. The electrocardiographic tracings were found within normal limits. The follow-up study on these patients shows that there was very little change in the original diagnosis. In three instances, the murmur disappeared entirely. In two cases, a diagnosis of mitral regurgitation was finally made and in one instance the so-called non-pathological murmur was found to be due to congenital heart disease. From a study of these facts, it can be stated that a diagnosis of a non-pathological murmur can be made with a good deal of assurance, and that such patients followed over a number of years will be found to develop no heart disease in spite of the fact that the murmur persists.

In differentiating between systolic murmurs of organic nature and those that are non-pathologic, the following facts should be taken into consideration: So-called functional murmurs may be heard at the apex, along the left border of the sternum or over the aortic area. They are usually short, not intense, and are well localized; they change in intensity with position of the patient, sometimes being louder in the upright position and in other instances are heard best in the prone position; they do not replace the first sound and are not heard through to the back. Functional murmurs are more common in patients with fast hearts. On the other hand, murmurs of organic nature are louder and longer; they often replace the first sound, are commonly well transmitted and are frequently heard at the angle of the scapula. There are, of course, exceptions to all these statements, and in a general way the nature and intensity of the murmur is of secondary importance. What is far more important in this differential diagnosis between the organic and non-organic murmur is the patient's

history and the size of the heart as found by x-ray examination. It is well known that 90 per cent of heart disease in young people is due to the rheumatic infection. In considering the patient with a systolic murmur, if, after a careful and understanding history, rheumatic infection can be ruled out and if the heart is found within normal limits as to size and contour, one is safe in concluding that the murmur is unimportant, and needs no treatment. On the other hand, if a history of rheumatic infection is obtained, the systolic murmur must be considered as a possible early sign of valvular disease and must be followed over a period of time before a definite conclusion can be reached. Further, if on x-ray examination the heart is found enlarged or changed in contour, the systolic murmur should be considered organic in nature. In passing, it may be stated that percussion is rapidly proving of decreasing value and that an accurate opinion as to the size and contour of the heart, especially in early heart disease, can be obtained only by roentgen examination. In my opinion, the x-ray is not used nearly enough in the study of heart conditions. The electrocardiogram has been of little assistance in differentiating between organic and functional heart disease in young people.

A good many children have been examined who were told that they had a heart murmur during an attack of some acute febrile disease. As is well known, murmurs heard during fever are due for the most part to the increased speed of the heart and commonly disappear when the temperature returns to normal. It is not safe to give an opinion on the heart while the patient has fever. It would be better not to mention the possibility of a heart condition until the child has fully recovered from the febrile disease and the heart studied more carefully under more normal conditions.

Non-pathologic murmurs need to be differentiated from congenital heart disease. Such differentiation is usually not difficult. The murmur of congenital heart disease is usually quite typical, it is harsh, prolonged, rasping in type, commonly occupies the entire heart cycle and is unusually well transmitted, often being heard throughout the chest, down both humeri and even on top of the head. The point of maximum intensity of the congenital murmur is usually

along the left border of the sternum or over the base of the heart but rarely over the apex. The murmur is often accompanied by a thrill. In those cases with the characteristic high-grade cyanosis and clubbing of the fingers the diagnosis is evident. However, it must be noted that the majority of patients with congenital heart disease who live beyond early childhood have neither cyanosis or clubbing of the fingers. X-ray examination often helps greatly, as the contour of the heart in congenital lesions may be quite characteristic and the six-foot film may be diagnostic in itself.

The Venous Hum

It was noted previously that in twenty-four of these patients, a hemic murmur was heard. This murmur, the so-called "venous hum," often leads to errors in diagnosis. It is heard in the vessels of the neck, in the supraclavicular space, most commonly the right, just above the clavicle. It runs through the entire heart cycle and varies greatly in intensity with position of the patient's head. When the vessels of the neck are put on stretch, the murmur is greatly intensified; when the stretch is released, the murmur may disappear entirely. It is usually heard best in the upright position and commonly disappears in the prone position. This murmur is often transmitted over the base of the heart and can be heard over the aortic area and not uncommonly is heard over the apex. If one bears this fact in mind and remembers to place the stethoscope in the supraclavicular space in listening to the heart, the origin of some of these functional systolic murmurs will be discovered. Movement of the patient's head will cause a change in intensity in these transmitted hemic murmurs heard over the aortic area or apex.

Extra-Systolic Arrhythmia

What has been said about the systolic murmur is also true in a general way of the extra-systole. Before the introduction of modern methods in cardiology, premature beats were considered as indicative of organic heart disease. Mostly as a result of Mackenzie's work, it soon became evident that the extra-systole could occur in otherwise normal hearts. Recently, however, the extra-systole has been carefully analyzed and it has been shown by a number of writers that this irregularity of the heart may or may not be due

to organic heart disease. Bass¹ has divided extra-systoles in children into: (1) emotional; (2) toxic, following acute infections which may or may not indicate early involvement of the heart; and (3) idiopathic, which may be permanent and do not necessarily mean heart disease. Boas and Levy² in a recent article discuss extra-systoles of clinical significance and conclude that "extra-systoles may offer valuable evidence of myocardial damage or strain, and their discovery should always lead to a careful cardio-vascular examination and to attempt to determine their cause."

It has been known for a number of years that the extra-systoles which occur in an already diseased heart may indicate beginning decompensation and in some instances, especially in the case of auricular extra-systoles, may be the premonitory sign of a developing auricular fibrillation, while frequent ventricular extra-systoles in arterio-sclerotic cardiac disease or following coronary thrombosis increases the danger of the fatal ventricular fibrillation. I have had occasion to follow a number of children with mitral stenosis who, for a period of years, had normal rhythm of the heart and then began to develop frequent auricular extra-systoles and it could be predicted that most of such patients would, sooner or later, develop auricular fibrillation. In our experience in the convalescent wards at Lymanhurst, in those children who were suffering from sub-acute rheumatic fever, extra-systoles are always considered of significance, and may be an early sign of acute carditis. In any acute infectious disease, the development of extra-systoles should be cause for caution. Most of the extra-systoles developing during an acute febrile disease disappear as the toxic condition subsides, but occasionally are an indication of acute cardiac involvement which may lead to permanent damage. However, extra-systoles of no clinical importance do occur in children not uncommonly, and these cases can be differentiated from those which accompany organic heart disease.

In our series of cases, we have studied twenty-six such patients. These children have been followed from one to eight years. In several patients, the extra-systole was heard on one examination and not heard at the next. In a number of instances, the extra-systole occurred at regular

intervals of either every second or every third beat and this condition remained permanent for as long a period as eight years. One such patient was a girl who was first seen at eight years of age, whose mother stated that she had been told when the child was three years of age that the child had an irregular heart. On the first examination a so-called *pulsus bigeminus*, a normal beat alternating with an extra-systole, was heard; examination of the heart was otherwise negative and x-ray examination at this time showed the heart normal as to size and contour. This patient was seen repeatedly over a period of five years and at each examination the same persistent irregularity was present. Repeated examinations of the heart, including x-ray examinations, showed that the heart was otherwise entirely normal in spite of the persistent irregularity.

In these twenty-six patients with extra-systoles who have been followed over a number of years, in no instance did definite organic heart disease subsequently develop. Our criteria for assuming that an extra-systole is of no clinical importance is very similar to the criteria used in establishing the significance of a systolic murmur. In children and young adults, if an extra-systole is heard and no history of rheumatic infection or no enlargement of the heart is found on x-ray, it can be concluded that such extra-systoles are unimportant and will not lead to organic heart disease. Non-organic extra-systoles usually disappear when the heart is accelerated, while extra-systoles of organic nature usually increase on exercise. Most children with extra-systoles are not aware of the irregularity in their hearts; they require no treatment, and it is advisable not to mention the irregularity.

Neuro-Circulatory Asthenia

Another condition which often leads to errors in diagnosis in young people is the condition known as effort syndrome, soldier's heart, or neuro-circulatory asthenia. This condition is much more common in young adults but does occur in children of school age. Neuro-circulatory asthenia is of two main types: (1) a constitutional type which is commonly familial and which comes on early in life; and (2) the type which comes on after acute infectious diseases. The constitutional type is characterized by a gen-

eral physical inferiority. These patients are usually of the asthenic type; they complain of shortness of breath, pain over the heart, tachycardia and palpitation and skipping of the heart, easy fatigue, and profuse perspiration on the slightest exertion. On physical examination, it is common to find systolic murmurs over the apex or over the pulmonic area. The heart sounds are usually rapid and the response to exercise is poor. The blood pressure is commonly low at rest, and rises very rapidly on slight exertion. The hands are usually clammy and cyanotic and it is common to find a coarse tremor of the extended hands. These patients present many of the symptoms of hyperthyroidism but can easily be differentiated from this condition by the history and by studying the basal metabolic rate.

The type of neuro-circulatory asthenia which follows acute infections presents in a general way the symptoms of the constitutional type but in these cases the patient states definitely that his trouble came on after an attack of influenza or other acute infectious disease. Neuro-circulatory asthenia following acute infections usually subsides after a few months if the patient is restricted in his activities and is not made heart conscious by a faulty diagnosis.

Eighteen patients in our Lymanhurst series have been classified as neuro-circulatory asthenia. These patients were marked cases of the constitutional type, presenting the typical clinical picture. Many milder cases were classified in the "no heart disease" group. They were all asthenic individuals with many symptoms which might lead one to suspect cardiac disease. They complained of easy fatigue, refused to take regular gymnasium work in school, and did not enter into competitive sports. Four of them had been informed that they had heart disease. Six of them had apical systolic murmurs. X-ray examination revealed no cardiac enlargement in any case but four had so-called "drop hearts" and seven had hearts smaller than average. This finding of a small heart in such patients is well known and an attempt has been made to explain their symptoms on the basis of under-development of the heart. These patients have been followed a varying number of years. The diagnosis was not changed in any case but some of them showed marked improvement in symptoms. Neuro-circulatory asthenia is a definite clinical entity; the clinical

picture can easily be confused with organic cardiac disease if the condition is not borne in mind. More than anything else, such patients need the assurance that they have no heart disease. Often a careful, complete physical examination, followed by a confidential understanding discussion will produce marked improvement. The rapid heart rate of which they complain needs no medication; they should never receive digitalis. Outdoor graduated exercise within their physical limits should be encouraged.

Summary and Conclusions

1. Two hundred thirty-one patients diagnosed as having non-organic cardiac conditions have been followed over a period of years.
2. These patients fall into three main groups: (1) non-pathologic murmurs, (2) extra-systolic arrhythmia, (3) neuro-circulatory asthenia.
3. The change in trend of thought concerning the systolic murmur and the extra-systole is

discussed and the criteria for differentiating between the organic and non-organic abnormalities of this type are given.

4. The importance of not confusing neuro-circulatory asthenia with organic heart disease is stressed.

5. It is pointed out that while systolic murmurs and extra-systoles may indicate organic heart disease, it is possible to differentiate correctly the organic from the functional type of case.

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BENIGN LYMPHOCYTIC MENINGITIS OR ACUTE ASEPTIC MENINGITIS

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THESE terms are used to indicate a relatively rare syndrome which clinically simulates an acute purulent or tuberculous meningitis. Patients showing a moderate to severe lymphocytic pleocytosis in the cerebro-spinal fluid form a small but important group under the general classification of meningitis.

Considerable interest has been shown on this subject by a few medical writers and investigators. There is a dearth of information on this subject in the textbooks on clinical medicine and neurology. It seems that only a few have become sufficiently interested to investigate this matter. Until an article by Wallgren appeared in a Swedish Pediatric Journal in 1925, nothing definite was to be found on the subject. This article formed the subject of a comprehensive report in the American literature by Viets and Watts,⁷ of Boston, who observed five cases in the Massachusetts General Hospital.

About this time Doctor Epstein of Boston encountered a case with many similar character-

istics at the Boston Psychiatric Hospital. This patient showing cerebral symptoms of an organic nature was found to have the typical signs and blood findings of infectious mononucleosis, commonly known as "glandular fever." Because of the uniqueness of the condition, the case was reported in detail.⁴ Simultaneously there appeared a similar report in the Scandinavian literature by A. H. Johansen (1931). In both these articles the relationship between lymphocytic meningitis and infectious mononucleosis was emphasized.

Recently interest in lymphocytic meningitis was stimulated by some experimental investigations of a filtrable virus isolated from patients with this disease. The work of Armstrong¹ and of Rivers and Scott⁶ indicates that a filtrable virus is the causative agent of acute lymphocytic meningitis and tends to prove that the disease is a clinical entity. Some of this work has consisted of agglutination tests with convalescent and recovered cases for evidence of

anti-body formation and experimental inoculations with the spinal fluid from active cases. Thus far, the evidence, as stated, seems to prove that this condition is an entity rather than a symptom or complication.

An idea of the rarity of this condition may be gathered from the fact that two cases are recorded at the University Hospital and five at the Minneapolis General Hospital.³ All of these have been seen within the past eight or nine months.

As previously stated, these cases usually simulate the purulent and other types of meningitis, particularly the purulent forms. The symptoms are usually sudden in onset, occurring in otherwise healthy individuals. A history of sore throat and so-called "flu" or cold is present. In two or three days a severe headache with chills, nausea, vomiting and neck pains develop with variable mental reactions all the way from perfect lucidity to complete disorientation and confusion. The age group is wide, extending from fifteen to forty years. When first seen these cases cannot be differentiated from the other forms of meningitis.

The spinal fluid findings establish the diagnosis in practically all cases. The characteristic changes are quantitative. The qualitative changes depart very slightly from normal findings. The pressure is moderately increased, there is a moderate to severe lymphocytic pleocytosis ranging from fifty to one thousand or more cells per cubic millimeter of spinal fluid. A few polymorphonuclear cells may be found early but the lymphocytes are overwhelmingly predominant. In the five cases reported by Viets and Watts, the cell counts varied from 150 to 500 lymphocytes during the height of the disease. In a series of five cases recently recorded at the Minneapolis General Hospital the cell count averaged lower, but the lymphocytic predominance persisted. The sugar and chloride of the fluid are normal; the protein may vary slightly from the normal limits. Direct cultures and smears are negative. The colloidal reaction is normal, being of the end zone or meningitic type. On examination of the eye grounds, a slight blurring of the optic discs is found in most cases. Rarely is papilledema seen.

Naturally a clinical picture and spinal fluid findings like the above arouse one's curiosity as

to the type of meningitis one is dealing with. Knowing how grave the prognosis is in most cases of meningitis and how important early treatment is in certain types, this curiosity is well justified.

A few words relative to the differential diagnosis of the meningitides might not be amiss at this time. While the clinical history and examination are of assistance, the spinal fluid examination is usually decisive.

Recalling the findings in the lymphocytic type of meningitis, it becomes obvious that we can rule out a large group immediately, namely, the purulent forms. Tuberculosis meningitis can be ruled out quite readily as well, but may offer some difficulties.

The purulent types—pneumococcic, staphylococcic, streptococcic, meningococcic (epidemic)—have spinal fluid findings that are quite constant. The pressure is increased, the cell count usually runs very high into the thousands, the cells are overwhelmingly polymorphonuclear leukocytes. The fluid is cloudy or purulent. Direct smears usually show the offending organism. Cultures are positive. The sugar content is lowered. In many cases no sugar is found due to the glycolytic action of the bacteria in the fluid. The chlorides are reduced and the protein increased greatly. These types usually offer little trouble if the spinal fluid is examined even partially. A complete spinal fluid examination may be of academic interest but is not necessary.

It is very important to recognize the epidemic form. This may be differentiated by direct smear and a Gram stain which will, in nearly all cases, reveal the Gram-negative intracellular diplococci. Cultures for types are of value although not often feasible.

In differentiating tuberculous meningitis, the history of possible exposure and the physical examination are important. The age incidence, usually occurring in childhood, is of value. The onset is usually not as sudden except in the milary forms. The tuberculin test and lung x-ray are of great value. The spinal fluid findings are quite constant and diagnostic to a high degree. The cell count, usually lymphocytic in character, is relatively low. The sugar content is almost invariably lowered, which is of great value in differentiating it from epidemic encephalitis. The pressure may be increased;

the protein is little changed. The chlorides are quite markedly lowered. Organisms may or may not be found on direct smears. Guinea pig inoculations are of great value. A pellicle frequently forms in the spinal fluid when it has been left at room temperature for some hours.

In luetic meningitis the spinal fluid findings may be of the lymphocytic type but this can be ruled out with blood and spinal fluid Wassermann tests.

Poliomyelitis may offer some difficulties in differentiating it from lymphocytic meningitis. The spinal fluid findings may be very similar. Mild forms, without paralysis, perhaps cannot be differentiated. Some authorities are not yet ready to accept lymphocytic meningitis as an entity but consider it as being related to, if not identical to, mild poliomyelitis. It is hard to believe, however, that cases of poliomyelitis with cell counts running into the hundreds, will not result in residual paralysis. Thus far, experimentation has failed to produce evidence that the lymphocytic form of meningitis is related to poliomyelitis. Intraspinal and intraperitoneal injections in animals of the spinal fluid of active cases of lymphocytic meningitis have failed to produce paralysis. Agglutination tests have borne this out, too. The course in recorded cases of lymphocytic meningitis is so definite and uniform that it is difficult to argue this point. No recorded cases of lymphocytic meningitis have developed residual paralysis. As an aid in the differentiation it might be stated that there are usually many polymorphonuclear cells in the spinal fluid during the early stage of poliomyelitis. The cell count is usually lower in poliomyelitis. The protein is increased. The occurrence in epidemics is also of value in differentiating it.

Epidemic encephalitis may be confounding as well. It is highly probable that many cases have been diagnosed epidemic encephalitis which were in reality lymphocytic meningitis. The clinical history and findings in encephalitis are usually suggestive. Mild cases, however, may be impossible to differentiate. Never has marked lethargy been noted in lymphocytic meningitis. The spinal fluid cell count is usually low; the sugar is elevated. Low normal or subnormal spinal fluid glucose militates strongly against acute epidemic encephalitis. Its long course is also of value in diagnosis.

There are other conditions which must also be considered in the differentiation. Most of these can be quite readily ruled out. Meningism, usually occurring in children associated with acute infectious diseases, shows an increased spinal fluid pressure, but absence of cells.

Mumps meningitis, a syndrome more common than formerly thought, can usually be ruled out. Birnberg⁷ has reported quite a few cases of this type. Herpes zoster, typhus, Malta fever, infectious mononucleosis, multiple sclerosis, post-infectious and vaccinal encephalomyelitis and brain tumors sometimes produce meningeal symptoms.

Aseptic meningeal reactions to septic foci in the cranium can usually be ruled out. Septic foci such as mastoiditis, sinus thrombosis, osteomyelitis of the skull, extradural abscess, intracerebral abscess, and septic emboli often cause meningeal symptoms. In these cases the cells in the spinal fluid may reach 500 or more but the polymorphonuclears usually run up to 30 per cent. The history and evidence of foci are of assistance in the diagnosis.

The course of lymphocytic meningitis is self limited. The prognosis for complete recovery without residual effects is good. In all cases recorded (which indeed are few at this time) the courses have been quite constant and definite. Recovery occurs in from two to six weeks. No sequelæ have been noted in any case. During the first few days after the onset, the usual symptoms of meningitis persist, such as headache, rigidity of the neck, nausea, vomiting, photophobia and, in some cases, disorientation. The fact that the prognosis is so good should justify an effort to make an accurate diagnosis. When one considers the unhappy prognostications we are compelled to make in most cases of meningitis, it is refreshing to be able to make a definite prognosis of recovery.

The five cases reported in Boston and those seen at the Minneapolis General Hospital all ran definite courses. By this I mean that recovery occurred within the two to six weeks period without sequelæ. There were, of course, individual variations in the symptoms. The spinal fluid may show an increase in cells after the symptoms have subsided.

The treatment is symptomatic and palliative. Repeated spinal punctures relieve considerably

the headache and mental disturbance. Morphine and sedatives and the usual supportive measures are indicated.

Report of a Case

On Monday, March 2, 1936, I was called to see an unmarried woman, twenty-three years of age, who had been in good health until a few days prior to the onset of her present illness. On February 26, she had had a sore throat and other symptoms of a cold. On the evening of the twenty-eighth, she had had a severe headache, neck pain, nausea, fever and chills. Her condition seemed worse on March 2.

She complained of severe headache, very rigid and painful neck, and some backache. She had been vomiting off and on for two days. She objected to the light and wanted to be left alone. Upon examination I found her temperature 102, pulse 106, and respirations 18. Her throat was slightly inflamed. The ears were normal. The eyes reacted to light and accommodation. Her eye grounds were slightly blurred. The Kernig and Brudzinski signs were mildly positive. She was quite clear mentally. There was no paralysis or loss of sensation. The tendon reflexes were slightly increased. There was no urinary retention. No rash was noted.

A spinal puncture revealed a moderately increased pressure. The fluid was clear. About ten c.c. were removed. The fluid showed a cell count of 1,200—all lymphocytes, which immediately raised the question as to the type of meningitis present. Direct smears showed no organisms. A specimen was sent to the State Board of Health, which reported the Wassermann was negative; the culture was negative; the protein and chlorides normal; the glucose normal. Guinea pig inoculation proved negative.

The Widal and blood Wassermann also proved negative. The blood findings the second day were WBC 9,800 (64 p.m.n., 30 lymph., 3 mono., 1 baso.) r.b.c. 4,230,000; Hgb. 88%.

The urine was concentrated, otherwise negative.

The blood pressure was 110-78.

A diagnosis of benign lymphocytic meningitis was made and a favorable prognosis given.

The headaches persisted to a variable degree for a week. The rigidity of the neck was very marked until about the eighth day. Her temperature varied from 100 to 102 for a week, after which it came down gradually until it was normal on the tenth day, where it remained. Her recovery was rapid after this and when the last spinal fluid examination was made on the twentieth day, it was found to be normal and her clinical symptoms had disappeared. At the present time she is perfectly well with no residual paralysis or other effects.

On communicating with several staff members at the University and Minneapolis General Hospital, it was found that the cases seen at the General Hospital were almost identical with mine. The onset, findings and course were similar. A diagnosis of benign lymphocytic meningitis seems justifiable. No doubt more cases will be reported in the near future and possibly an etiological agent discovered.

Summary

Lymphocytic meningitis is characterized by an acute onset, simulating that of the purulent forms of meningitis, with headache, nausea, vomiting, neck pain and moderate fever. The disease is self limited, lasting from two to five or six weeks. Recovery takes place without residual effects.

The cerebrospinal fluid shows a marked lymphocytic pleocytosis, without polymorphonuclear cells. The cells may reach 1,000 or more per cubic millimeter. Protein in the fluid is normal to slightly increased, but the sugar and chloride content do not vary from the normal range. The colloidal gold curve suggests meningitis. Thus far there is no evidence that it is infectious.

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CASE REPORTS

SURGICAL ABDOMEN SIMULATED BY VAGINAL SEPTUM AND FREE PERITONEAL BLOOD

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H. T., a white girl of thirteen, was admitted to the Wilson Hospital, October 15, 1935, complaining of abdominal pain, nausea and vomiting.

One year previously, she had what was diagnosed by another physician as acute appendicitis, with colicky pains in the lower abdomen, nausea and vomiting. There had been no symptoms for three or four months following this attack. Crampy lower abdominal pains, appearing at irregular intervals, then followed, but were dismissed by the unintelligent parents as "mild" appendicitis. There had never been any medical or other surgical disorders; she had never menstruated.

Eight hours previous to admission, lower abdominal pains had begun, becoming increasingly colicky and severe, followed after some hours by nausea and vomiting (twice). She could not localize the pain in either lower quadrant, and there appeared to be no radiation. There had been no bowel movement in twenty-four hours, and she had been unable to urinate since the pain became severe.

Examination revealed a well-nourished, healthy appearing girl of thirteen with secondary sex characteristics noticeably developed.

The abdomen was diffusely tender, and marked rigidity of the lower quadrants was present. No mass was palpable. Rectally, a tense, rounded mass low in the pelvis was felt, somewhat resembling a small, fetal head in shape. The hymen was perforate, the vagina patent, and there was no bulging.

Urinalysis was negative; leukocyte count 12,000; temperature 99.4°; pulse 110; respirations 26.

There was evidently an acute process in the lower abdomen, and torsion of an ovarian cyst, rupture of a graffian follicle, appendicitis, and possible intraperitoneal rupture of retained menstrual blood were considered.

Operation.—A suprapubic incision under low spinal anesthesia revealed a most striking picture. The drawing illustrates the long, cylindrical, distended vagina, on whose superior pole an infantile, firm uterus was perched. Neither the uterus nor the fallopian tubes were distended, but from the abdominal ostia, especially on the right side, dark blood was oozing. A few ounces of partially clotted blood were found in the lower abdomen.

Vaginal examination disclosed a complete transverse vaginal septum, about one and one-half inches internal to the hymen. The canal was painted with merthiolate, and a closed hemostat thrust through the membrane, releasing one and one-half pints of dark, liquid blood, with diminution of the vaginal distention. The tubes were not adherent so there appeared to be no contraindication to relief of pressure. A kinked, adherent, quiescent appendix was removed and the abdomen closed.

Course.—Uneventful convalescence followed, with dismissal on the twelfth day. A normal menstruation began five weeks later, the flow being very dark. Menstruation has been regular every four weeks since that time.

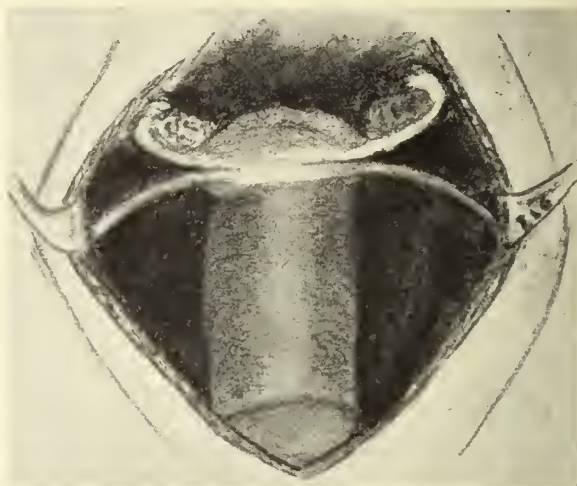


Fig. 1. Long, cylindrical, distended vagina (author's case).

Discussion

Gynatresia may occur at any level in the genital tract from the hymenal ring to the uterine fundus, with no presenting symptoms until menstruation begins. Progressive distension, above the obstruction, results in vaginal dilatation (hematocolpos), then uterine (hematometra) and finally tubal filling (hematosalpinx). Imperforate hymen is by far the most common form of gynatresia, Findley estimating that over one thousand cases have been reported, of which about one-third were acquired.³ Vaginal septa are rare.^{3, 4, 7, 10, 18} Complete vaginal septum results in menstrual obstruction and is usually diagnosed and treated soon after puberty, although one case was not diagnosed until age twenty-six. Incomplete septum leads to dyspareunia^{3, 10, 18} and delayed labor.^{4, 18} An interesting form is the adherent labia minor in babies and young girls,^{5, 8, 15, 19, 22} which results in urinary retention. Technically, this can not be considered a gynatresia.

As specular and digital vaginal examinations are avoided during puberty, the diagnosis of a vaginal obstruction must be made indirectly, unless there is present a bulging, fluctuant imperforate hymen, usually bluish in color. Nelson¹⁷ reported a case of imperforate hymen, hematocolpometrosalpinx and free blood in the peritoneal cavity, diagnosed and operated as acute appendicitis (no rectal or vaginal examination made) in a girl of fourteen.

Bland⁹ has noted leakage from the abdominal ostia of the distended tubes, resulting in retrouterine hematocoele, and when infected, local or diffuse peritonitis. Hirst¹¹ has noted spontaneous rupture: (a) into the

peritoneal cavity with consequent peritonitis, often fatal; and (b) into the vagina or through the hymen, with resultant poor drainage through the small opening, so that suppurative of the retained blood frequently occurred.

Older writers stress the dangers of relieving menstrual obstruction, because of: (1) stress on adherent tubes;¹⁷ (2) possible danger of peritonitis;¹¹ and (3) rapid decomposition and infection of retained blood.² Sir J. Y. Simpson has stated, "Beware of making light of such a case to the patient's friends, and beware of telling them that the operation is harmless." Hirst¹¹ taught dogmatically that if the tubes were distended, they must be removed before the membrane should be incised, to prevent peritonitis. Despite these doleful predictions, many authors have incised or excised these obstructions under aseptic precautions, with no harmful results reported.^{1, 5, 6, 9, 13, 14, 16, 17, 20, 23} Bickham² believes that the membrane or septa should be crucially incised, then excised.

Conclusion

Gynatresia should be ruled out when lower abdominal pain or retention of urine occurs in a girl or woman who has never menstruated.

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ERYTHEMA EXUDATIVUM MULTIFORMI IN A PRIMIPARA COMPLICATED BY HEMORRHAGE FROM MUCOUS MEMBRANES*

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ONE is struck by the few reports in recent literature of severe hemorrhage complicating this rather common disease.

Etiology and History.—Erythema multiformi was first described by Hebra in 1866 as a systemic invasion by some unknown factor characterized by an acute circumscribed inflammation of the skin, confined almost exclusively to the papular layer, but occasionally involving the mucous membranes. Little that is universally accepted has been added relative to the causative factor of the disease. Various authors have suggested as probable causes, foods (especially those most commonly concerned in the production of urticaria), drugs (especially quinine and the barbiturates), and toxemia.

Kaposi in 1893 said: "Rarely the vulvo-vaginal mucous membranes are attacked."

Mracek in 1902 stated: "In many instances the mucous membranes are also attacked—except in the bullous type you only seldom come across vesical formation." Macleod in 1921 said: "In some cases the mucous membrane of the nose, conjunctiva, and genitalia, are attacked." Ormsby too, in 1921, observed: "It occurs but rarely upon the mucous membranes of nose, mouth and conjunctiva."

Evidently, according to the available literature, the involvement of the mucous membranes is rather infrequent.

Sir William Osler in 1895, in a published paper on the visceral complications of erythema exudativum multiformi, stated, "*** a variable number of visceral complications of which the most important are gastrointestinal crises, and hemorrhage from the mucous membranes." He reported three cases with hemorrhage from the bowel, and eleven cases with colic, vomiting, and diarrhea. He considered that the gastro-intestinal crises were due to a localized edema of the walls of the tract.

Symptoms.—Chilly sensations, fever, joint pain, inflammation of the conjunctiva, pseudo-membranous inflammations of the mucous surfaces, lips, tongue, mouth, nares, bronchi, and vagina sometimes occur. Mild to high temperatures, occasionally vomiting and diarrhea; at times a severe involvement of the sclera and conjunctiva, with resulting blindness, mild leukocytosis and early anemia are maintained. This with the typical macules, papules, vesicles, and bullæ of the skin, usually more or less symmetrically located, the whole frequently complicated with cervical adenitis, presents a truly "multiformi" of symptoms and eruptions.

*Read at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 5, 1936.

Treatment.—This is entirely symptomatic. Sutton and Sutton recommend daily flushing of bowels and kidneys with salines and alkaline diuretics, Salicin, ergot and adrenalin, with calamine lotion externally.

Results.—The milder type of case is usually self limited, running a course of a few weeks with a tendency to recurrences and occasionally severe complications which entitle the condition to a guarded prognosis and early hospital care.

It was not the intention of this discussion to present a dermatological resumé of erythema multiformi, its course, symptoms and treatment, but to depict some unusually severe hemorrhagic aspects which occurred in a patient.

Case History

Mrs. L. A. L., aged 24, and one of eight children raised on a farm, had been a family patient since girlhood. She was first seen on December 22, 1934. Family history was negative except that one brother had an entire webbing of the fingers of both hands. Her mother died of carcinoma of the pancreas.

The patient had always been well except for throat infections and a tonsillectomy had been performed some years before. She had married a month previous to her first visit. Her habits were excellent, kidney and bowel functions normal, and her weight, best, average and present, 120 pounds. Menses began at the age of fourteen, and were on a twenty-eight day cycle with slight cramps the first day, the last period having been December 13.

During the period between December 22, 1934, and September 11, 1935, the patient was seen and examined at the office nine times. Her general physical examinations were entirely negative. She had slight nausea during the first ten weeks of pregnancy. Pelvic mensuration was normal. Kidney function was normal. Blood pressure varied between 122-136 systolic and 78-86 diastolic. On August 29 the fetal tones were in the right lower quadrant, the head presenting. On September 11 she gave birth to a four and one-half pound boy, about ten minutes before my arrival. The stork was sitting on the chimney while I had to drive twenty-two miles. The delivery had apparently been rather precipitous, but there was no laceration. The placenta was delivered and on examination was found intact with the membranes. One c.c. of pituitrin was given as a routine. The patient's temperature was 99.6 and pulse 82 when I left. I talked to the nurse the second day. The patient's temperature was 98.7, pulse 74, and respirations 16.

On September 19, the eighth post-partum day, I was called to the farm home and got the following history: The patient had had a slight eruption on her body a few days before her baby was born, which had almost disappeared at the time of its birth, and she had neg-

lected to say anything about it at that time, I had not observed it, because I had seen her at night with kerosene lamps for illumination. On September 17, the sixth post-partum day, the eruption had recurred, had become rapidly generalized, involving the axilla, face, chest, abdomen, arms, thighs, and feet. The itching of her feet was most intense.

Papules, vesicles, and small bullae were present. Her temperature was 98.8, pulse 86, lochia normal, and uterus well contracted. She refused hospitalization because of financial reasons. On September 21 I was called hurriedly. She started to bleed from the vagina at 11 p. m. and flowed severely. Judging from the blood soaked pads, the hemorrhage had evidently been quite severe. I gave her pituitrin, ergotrate and intramuscular injections of ergot and finally packed the cervix with an iodoform pack, placed her in a ear and took her to the hospital.

The skin showed concomitant eruptions from papules to large bullae, with small vesicles in the mouth, nose and vagina. At the height of the skin eruptions the abdomen and lower chest presented a reddish black appearance resembling a rather diffuse purpura hemorrhagica. She vomited a number of times after admission. Stools were frequent, at times tarry and at times there was fresh blood present. Epistaxis occurred, cough was present and coarse bronchial râles were heard. The mouth and vagina showed a number of vesicles. Following removal of the vaginal pack no more hemorrhage occurred.

Her temperature during hospitalization registered from 99.2 to 102.4. Pulse on admission was 120, but gradually dropped to 76. The hemoglobin was 65, r.b.c. 3,820,000, w.b.c. 12,000, clotting time 8 minutes. The blood Wassermann was negative. Ergotrate and pituitrin 1 c.c. were given intramuscularly every three hours on admission, and then continued, three times a day for three days. Salicylates in enteric coated tablets, 5 grains every three hours were given, and locally a boric acid zinc oxide ointment and calamine lotion were applied. Itching of the feet was very troublesome. She was discharged on the tenth day, the hemoglobin being 75 per cent, w.b.c. 9,000, the temperature and pulse normal and the skin eruption much improved. The skin did not return to near normal until October 18.

Previous to the skin manifestation she had taken no drugs at all. Quinine, phenolphthalein, and the barbiturates were all ruled out. She has had no recurrences to date and the baby has done well though mostly on artificial feeding.

Summary

A typical case of erythema multiformi is reported presenting involvement of the skin and mucous membranes, with vomiting and diarrhea occurring at term in a primipara, who developed postpartum hemorrhage on the eighth postpartum day, with bleeding from the vagina and rectum and a hemorrhagic purpura.

CLINICAL PATHOLOGIC SEMINAR*

Conducted by E. T. BELL, M.D.

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Toxic Adenoma of the Thyroid

Case 25.—A woman, sixty-five years old, was admitted January 31, 1936, stating that at the age of thirteen she had developed a swelling in her neck. A private physician told her that she had a goiter. She was given medication which seemed to cause the goiter to recede. However, ever since that time she had been nervous and excitable with a reduced tolerance to heat. She had remained quite thin in spite of a hearty appetite. She had had several nervous breakdowns requiring psychotherapy.

In August, 1935, she became weak with orthopnea, dyspnea and swelling of the ankles. A private physician advised rest and Lugol's solution. She responded fairly well to treatment; the swelling of her ankles and feet subsided. In October, 1935, she had a recurrence of symptoms and in addition had a smothering sensation in her chest and neck and rapid pounding of the heart; she had extreme weakness. She came to the outpatient department and was sent to the hospital.

The temperature was 98.4°; pulse 160; respiration 22; blood pressure 190/78. The history by systems was essentially negative. She was undernourished, very nervous and had many purposeless movements; dyspnea quite marked; skin flushed, warm and moist. A hard nodule could be felt in the substernal notch which seemed to move upward on swallowing; no definite exophthalmos; von Graefe's sign was negative. Moderate emphysema was noted over the chest and a few crepitant râles were heard over both bases. Heart rate extremely rapid, forceful and irregular; the heart was fibrillating; a systolic murmur was heard over the apex and at the base. The liver was two fingers below the costal margin in the right mid-clavicular line and one finger below the umbilicus. There was moderate pitting edema of the anterior aspects of the legs and over the sacrum. The reflexes were hyperactive. Babinski's sign was negative.

Urinalysis: Albumin +; an occasional red blood cell; an occasional pus cell; specific gravity 1027. Two later examinations of the urine gave similar results. Blood: hemoglobin 70 per cent; red cells 3,930,000; leukocytes 10,400 with 70 per cent polymorphonuclears, 24 per cent lymphocytes and 6 per cent monocytes. Rytz and Kahn tests were negative.

An electrocardiogram showed slight lowering of the QRS, auricular fibrillation and a low T₂ which suggested some myocardial damage. A six-foot study of the heart and chest revealed pleural effusion on the right with possible calcified substernal thyroid. X-ray of the lower spine showed hypertrophic changes in the lumbar spine and also multiple biliary calculi. The basal metabolic rate on admission was +50.

She was given digitalis and Lugol's solution. Frequent thoracenteses were done with removal of about 1,000 c.c. of fluid each time. She got along fairly well and the basal metabolic rate on March 4 was 32. On March 14 she developed a chill, pain in the chest and the temperature rose from normal to 102.2°. Examination revealed an area of consolidation in the left chest. X-ray showed increased density in the lower two-thirds of the left lung, thought to indicate pneumonia. The temperature remained between 102° and 104°. She became very listless, drowsy and extremely weak; refused to eat or take liquids. On March 18 she became stuporous. On the following day the respirations became rapid and labored; there was extreme dyspnea and cyano-

sis; the pulse became rapid and thready. She expired March 19 after forty-eight days in the hospital.

Postmortem Examination: The body was emaciated; there was slight jaundice; no edema; 200 c.c. of purulent fluid in the left pleural cavity; no fluid in the other serous cavities. The heart weighed 260 grams; the valves were normal; there was moderate atheroma and calcification of the coronary arteries with a little narrowing of their lumens; there were no scars in the cardiac muscle. There was well developed bronchopneumonia in the lower lobe of each lung. There was no appreciable chronic passive congestion of the liver or the spleen. There were a few small calculi in the gall-bladder and some dilation of the common bile duct but no stones were present in the duct at this time. The genito-urinary organs were normal. There was moderate atheroma and calcification of the abdominal aorta.

The thyroid gland measured 11 x 7.5 x 5 cm.; one portion extended down into the thorax as far as the arch of the aorta and caused some compression of the structures passing through the thoracic inlet. On section the thyroid showed numerous cysts and areas of calcification; it was composed of large adenomas. Microscopically there was extensive necrosis and degeneration of the adenomas but there were also areas of marked hyperplasia of the parenchyma.

Diagnoses: (1) Toxic adenoma of the thyroid; (2) Empyema of the thorax; (3) Bronchopneumonia; (4) Moderate coronary sclerosis.

Comment.—The patient had evidently suffered from hyperthyroidism due to toxic adenoma for a long time. Evidently there was cardiac decompensation at times; the edema of the legs was presumably of cardiac origin. Death was due to bronchopneumonia and empyema. It is unusual to find cardiac decompensation resulting from hyperthyroidism unless there is a previous disease of the heart. In this case there was some coronary disease but it was not very marked.

Adherent Pericardium

Case 26.—A boy of thirteen was first admitted on June 6, 1935. He had been perfectly well until April 13, 1935, when he developed scarlet fever. About one month later he began to have swelling of the ankles and legs and some pain in his knee joints. He remained at home on modified rest but the swelling gradually increased. On June 1 he developed a sudden severe pain over the precordium. A physician advised immediate hospitalization.

On admission it was found that both knees and the right shoulder were swollen and very tender to palpation. Auscultation revealed systolic and early diastolic murmurs at the apex of the heart.

Two urinalyses showed the urine to be full of red blood cells with occasional hyaline and granular casts. The hemoglobin was 63 per cent, red cells 3,400,000 and leukocytes 9,900. An electrocardiogram showed a low potential in all three leads with a suggestion of swift T-waves in the first and second leads indicating rheumatic heart involvement. A blood culture taken several days after admission was positive for Gram-negative diplococci, type undetermined, the significance being uncertain.

The patient was put on the usual routine of bed rest,

salicylates, sedatives, iron and digitalis. He had fever ranging from 101° to 103°. The pain in the precordium did not abate. X-ray of the chest and heart about one week after admission showed marked widening of the cardiac shadow which was thought to indicate pericardial and pleural effusion. X-rays taken at two-week intervals continued to show pericardial and pleural effusion. Several thoracenteses were done, which seemed to improve the patient's condition considerably. He responded very well to cardiac and supportive therapy. His temperature gradually returned to normal and he was discharged August 23, 1935.

He was followed at the heart clinic; was constantly kept on digitalis. He got along fairly well until February 19, 1936, when he developed a cough, dyspnea, orthopnea and tachycardia. He was admitted to hospital the following day.

The temperature was 100.6°; pulse 126; respirations 20; blood pressure 86/66. He had moderate difficulty in breathing. The lungs were essentially negative to auscultation. The heart was markedly enlarged to both left and right. The pulse was rapid and regular. Systolic and diastolic murmurs were heard transmitted to the axilla. A thrill was palpated at the apex and over the aortic region. There was no edema of the extremities.

Urinalysis was essentially negative. The hemoglobin was 70 per cent; red blood cells 4,000,000; leukocytes 11,750. Sedimentation time was two hours. A blood culture was negative. X-ray of the heart and esophagogram showed enlargement of the heart to left and right; some pressure on the barium-filled esophagus. However, the amount of pressure was not sufficient to indicate that the entire cardiac enlargement was on the basis of enlargement of the left auricle. There was some congestion of the lung fields. Conclusion: cardiac enlargement from mitral disease with probable pericardial effusion and pulmonary congestion. An electrocardiogram showed left axis deviation with auricular fibrillation.

The patient was put on digitalis and quinidine with supportive therapy but he gradually became more decompensated; the heart action became much weaker. He died March 26 after thirty-five days of hospital residence.

Postmortem Examination: There was no edema or jaundice; no ascites. There was 300 c.c. of clear fluid in the right pleural cavity; complete obliteration of the pericardial cavity by old fibrous adhesions. The fibrous pericardium was attached firmly anteriorly to the sternum and laterally to the lungs. The heart weighed 440 grams and all of its chambers were markedly hypertrophied and dilated. There was an old thrombus in the right auricle but there was no disease of any of the valves. There was well developed terminal bronchopneumonia. There was marked chronic passive congestion of the liver.

Diagnoses: (1) Adherent pericardium with hypertrophy and dilation of the heart and cardiac failure; (2) terminal bronchopneumonia.

Comment.—This is a common result of rheumatic fever in which the pericardium became involved but the valves escaped. Pericarditis is a very common complication of acute rheumatic fever; in most instances the valves also are affected. It has recently been claimed that adherent pericardium alone, without any valvular disease, does not result in heart failure but this case demonstrates clearly that hypertrophy and dilation of the heart and heart failure may result from adherent pericardium alone. The adhesion of the outer surface of the fibrous pericardium to the adjacent structures is believed to be important in causing the overwork of the heart.

Syphilitic Aortitis

Case 27.—A man, fifty years old, was admitted to hospital January 25, 1936. Two years before he had been told by a physician that he had high blood pressure. Soon after this he noticed that his ankles and legs were swollen. Shortly he developed dyspnea on slight exertion, orthopnea and spells of dizziness, especially on closing his eyes. The dyspnea and orthopnea became progressively worse. Two months before admission he developed a painless productive cough. The past history revealed that there had been gonorrhea at the age of seventeen, and syphilis at the age of eighteen with inadequate treatment for both. Otherwise the patient's health had been good to excellent up to the present illness.

Temperature was 99.8°; pulse 116; respirations 34; blood pressure 220/104. He was coughing considerably and appeared quite dyspneic and orthopneic. The pupils were dilated, did not react to light and reacted only very sluggishly to accommodation. The eye grounds showed marked hypertensive changes with edema of the discs and slight edema of the retina; there were caliber changes of the lumens of the arterioles; a few scattered hemorrhages. Systolic and diastolic murmurs were heard over the aortic area. The heart was markedly enlarged to both left and right. Numerous coarse moist râles were noted throughout the entire chest and dullness was noted over the extreme base of the right chest. The liver was palpable 3 fingers below the costal margin. There was no evidence of ascites; there was grade 4 pitting edema of the feet, ankles and legs.

Urinalysis: Albumin ++++; 100 to 150 pus cells; an occasional hyaline cast; specific gravity 1023. Tests repeated over a period of about 2 months gave similar results. In several specimens a few red blood cells were noted. Blood: hemoglobin on admission 78 per cent; leukocytes 16,150; red blood cells 3,620,000. Urthral smears showed numerous pus cells and bacteria; no evidence of gonococci. Spinal fluid: 68 mg. of protein; 55 mg. of sugar; no cells; Wassermann positive; Rytz weakly positive; colloidal gold curve was 555533100. An electrocardiogram showed a low ST₁, diphasic T₂ and left preponderance suggesting some myocardial damage. X-ray one week after admission showed probable effusion or pneumonic process in the left lower lobe and enlargement of the heart, left ventricular type.

Venesection on the day of admission removed 600 c.c. of blood. The patient was put on a régime of strict bed rest, morphine, aminophyllin and codeine. He had difficulty in voiding and was catheterized daily. On February 6 it was noted that the sensorium was becoming cloudy. On March 5 therapy for syphilis was instituted and he was given 1 gm. of tryparsamid intravenously; on March 9, 2 gm. and on March 14, 2 gm. On March 16 he began to complain of a high degree of visual loss. Examination showed that the margins of the discs were slightly indistinct; this was thought to be a toxic reaction to the tryparsamid injections. Two days later he had complete loss of vision. He did not respond to routine cardiac and supportive therapy. He gradually grew weaker and expired on April 2, about two months after admission.

Postmortem Examination: The body was somewhat emaciated; there was no edema or jaundice. There was very little fluid in the serous cavities. The heart weighed 690 grams; there was marked hypertrophy and dilation of the left ventricle. The aortic valve leaflets were separated at their commissures and the margins of the leaflets were rolled and thickened; the root of the aorta was markedly dilated and showed the characteristic puckering and thickening that are found in syphilitic aortitis. This is a typical example of syphilis of the aorta with involvement of the aortic valve. The other valves were normal. There was hypertrophy and dilation of the right ventricle which was interpreted as compensatory for the failing left ventricle. There was marked chronic passive congestion of

the liver. The prostate was enlarged and showed also a diffuse suppuration with a hemorrhagic cystitis. There was marked terminal bronchopneumonia. The brain showed no gross changes but microscopically there was a round cell infiltration of the meninges indicating syphilitic meningitis.

Diagnosis: Syphilitic aortitis.

Comment.—The interpretation of this case is somewhat difficult. Evidently the chief lesion in the terminal part of the illness was syphilis of the aortic valve with resulting cardiac failure. Syphilitic meningitis is also present. However, the eyeground changes and the high blood pressure indicate strongly that the patient suffered first from a primary hypertension. Apparently the syphilitic aortitis developed in a patient who already had symptoms of primary hypertension.

Acetylsalicylic Acid and Barbitol Poisoning

Case 28.—A woman, forty-two years old, was admitted first on January 26, 1936. In December, 1934, she had broken several ribs. A physician gave her barbitol tablets to alleviate the pain. Following this she gradually became addicted to barbitol. Later she developed a definite psychic upset and thought that people were trying to spy on her and that the clock was trying to converse with her. At this time she also had "goiter trouble" but this difficulty disappeared immediately after a local chiropractor had given her some spinal adjustments. She had also been troubled with asthma for a number of years; no medication but alcohol could alleviate this. During the year previous to admission the symptoms could only be aborted by the ingestion of large amounts of alcohol and the patient had been drunk on four or five occasions. On one occasion she is said to have drunk a quart of whiskey in one day. She continued to take barbitol in large doses and her husband finally persuaded her to enter the hospital for cure of this addiction.

Examination was essentially negative and she was given the routine therapy for chronic barbitol addiction. She remained in the hospital twenty-one days and was discharged apparently cured of the habit.

Following discharge she got along very well until the latter part of March, 1936, when she developed what was thought to be "stomach flu." She had a severe cough associated with diarrhea and vomiting. After

these symptoms had persisted for approximately four weeks she started to take aspirin tablets and luminal for relief. In a period of eight days she took about 1000 grains of aspirin and a large number of luminal tablets. Following this she developed marked vaginal and rectal bleeding and had several large emeses of blood. It was thought that she lost about 1 quart of blood each time. She took another 500 grains of aspirin and considerable amounts of luminal. Following this she became stuporous and was admitted to the hospital on April 28.

The temperature was 102°; pulse 130; respirations 40; blood pressure 108/68. She was semicomatose. The eyes reacted to light; the corneal reflexes were inactive. She was bleeding quite profusely from the right ear. Clotted blood was noted in the nares. Auscultation revealed that the heart sounds were barely audible, although the rhythm was regular. A diffuse rash was noted over the neck, shoulders and numerous purpuric spots from 1 to 5 cm. in diameter in the skin over the entire body. There was considerable vaginal bleeding. The hemoglobin was 90 per cent; 4,700,000 red cells; 10,000 leukocytes; 82 per cent polymorphonuclears, 11 per cent lymphocytes, 7 per cent monocytes. Spinal fluid removed on admission was clear, colorless and contained 4 polymorphonuclears. X-rays of the skull were negative.

She bled continuously from the mouth, ears, vagina and rectum. She gradually grew weaker, respiration became more difficult and she expired about eight hours after admission.

Postmortem Examination: There was 300 c.c. of blood in the stomach; the mucosa of the stomach showed diffuse bleeding; there was some old blood in the small and large intestines. There was fresh blood in the cavity of the uterus. Aside from evidences of hemorrhage, none of the organs showed any evidence of disease that was visible grossly. There were petechial hemorrhages in the substance of the cerebrum and cerebellum.

Diagnosis: Acetylsalicylic acid and barbitol poisoning.

Comment.—The skin eruption is interpreted as a toxic purpura and the bleeding from the nose, mouth, ears, gastro-intestinal tract and uterine cavity are also interpreted as effects of the poisoning. It is to be noted in this case that the amount of aspirin taken is far in excess of the amount ordinarily used even by aspirin addicts.

Libby's Hawaiian Pineapple Juice Omitted From the List of Accepted Foods

The Council on Foods reports that the Hawaiian Pineapple Juice of Libby, McNeill & Libby, Chicago, was accepted by the Council in 1934 with the permissible claim that it contains from 9 to 11 Sherman units of vitamin C per ounce and that it is practically equivalent to fresh fruit juice in nutritional values (vitamin C slightly reduced). In December, 1935, the concern requested that acceptance be withdrawn, and stated that it contemplated no change in its methods of manufacturing Pineapple Juice, and that there was no intention on its part to deviate from the principles embodied in the rules and general decisions of the Council. Based on this request the Council drew up an announcement of withdrawal of acceptance. Since that time, however, advertising for the product which has appeared in publications such as the *Saturday Evening Post* forced the Council to recast its previous statement and to inform the medical profession of the status of the product in the light of the claims now ad-

vanced. In general, the product is being advertised both as a drink to yield energy and as a food to be used in the ever popular reducing diet propaganda. Claims that the consumption of pineapple juice builds up the resistance of the body against infections of the upper respiratory tract and that Libby's Pineapple Juice is of particular significance in the reduction of weight are no more warranted than the fantastic claim that the consumption of pineapple juice will "sweep aside morning acidity." In reply to the Council's request for any evidence which it might have in support of the claims made, the company furnished a statement by John A. Killian, Ph.D., a commercial chemist of New York. In the opinion of the Council the comments offered by Dr. Killian do not warrant any alteration of the report. In view of the present evidence the Council voted that Libby's Pineapple Juice be removed from the list of accepted foods because the product is promoted in conflict with the Council's rules by the use of grossly exaggerated and unjustifiable claims which are believed to be seriously misleading to the public.—(J.A.M.A., Aug. 29, 1936, p. 660.)

EDITORIAL

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

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OCTOBER, 1936

Number 10

Deaths from Heat Prostration in 1936

VITAL statistics will eventually show how
many deaths occurred last summer through-
out the country from excessive heat. The num-
bers will run into the thousands. It will probably
never be known how many additional deaths
were indirectly due to the heat in invalids and
elderly individuals.

Some interesting observations on the subject
appeared in the *Statistical Bulletin* of the Metro-
politan Life Insurance Company of July, 1936.

It seems strange that the North Central states,
particularly Minnesota, Michigan, Wisconsin, Il-
linois, Ohio and Missouri, suffer the most, with
the exception of Arizona and Nevada, the two
states having as a rule the highest death rate
from this cause. On the other hand, Arizona's
neighboring states, New Mexico and Colorado,
and Nevada's neighbors, Oregon, Idaho and

Utah, are much below the average in this regard.

Perhaps the most remarkable fact is that the
southern states, North Carolina, South Carolina,
Florida and Alabama, for example, generally are
at least 50 per cent below the mean for the
United States.

It was particularly noticeable last summer that
elderly individuals constituted the majority of
those affected, while infants under one year of
age were much more frequently affected than in
any other year of life. Males as a rule are af-
fected three times as frequently as females, and
negroes several times as often as white people,
occupation doubtless having a bearing in both in-
stances.

In Minnesota during July some 670 deaths
were caused primarily by the heat and in 334
more heat was a contributory cause. Of the 670
deaths, 211 occurred in Minneapolis, 134 in Saint
Paul and 13 in Duluth. Of the 334 deaths, 182
occurred in Minneapolis, 70 in Saint Paul and 5
in Duluth. Our State Department classifies all
cases of heat prostration or exhaustion, heat
apoplexy or sunstroke under the one heading of
excessive heat. The cases in which excessive
heat was contributory were for the most part
individuals suffering from heart or kidney dis-
ease, but it seems likely that many instances in
which heat was reported as the primary cause
of death were of abnormal individuals. Many
practicing physicians saw no heat prostration
patients all summer while institutions such as
county homes and city hospitals reported numer-
ous cases. Deaths were so numerous in a short
period of time that an epidemic was simulated.

Poliomyelitis Today

ALMOST every year some section of the
country reports poliomyelitis in epidemic
form. Last year the epidemic started in North
Carolina and spread along the Atlantic Coast. In
1934 it was in California and other Western
states. In 1933 the disease was mildly epidemic in
North Atlantic regions and much more severe in
these same regions in 1931. This year an out-
break of the disease in epidemic proportions be-

gan in Alabama early in July, but was rather limited to that state and the adjoining states of Tennessee and Mississippi.

Minnesota has been quite fortunate this year, only twenty cases having been reported up to September 21. Of these twenty, three occurred in Minneapolis, two in Duluth, one in Saint Paul and fourteen in other parts of the state. Sporadic cases may be expected each year during the summer months in most of the states.

In spite of research and epidemiological study of the disease little has been learned which materially helps in the prevention of the spread of the disease or the cure of the individual patient. A concise résumé of our knowledge of the disease by Kenneth F. Maxcy, newly appointed Professor of Preventive Medicine and Public Health at the University of Minnesota, recently appeared.* The author calls attention to the fact that it has been pretty definitely proven that the virus of the disease gains entrance to the human body through the nasal mucous membrane, is neurotrophic and gains access to the spinal cord through the olfactory nerves, bulb and brain stem. The virus has a special affinity for the anterior horn cells of the cord.

The disease is spread from person to person just as influenza, measles, and chickenpox are. The presence of virus-neutralizing substances in the blood of the majority of adults indicates that the disease is much more prevalent than the comparatively small number of reported cases would lead one to believe. Changes in the spinal fluid and paralysis constitute the only definite diagnostic criteria. An indeterminate but large number of adults acquire the infection and temporarily become unknown carriers. This being the case, quarantine is ineffectual, although isolation of cases and contacts is distinctly worth while.

There is little evidence that the administration of immune sera before exposure, before the onset of paralysis, but after spinal fluid changes have been determined, or after the appearance of paralysis, accomplishes any good. There are some, however, who maintain that immune serum treatment is all we have that offers any hope of limiting the attack, and that it should be used.

The status of Brodie's vaccine has not been

definitely established. Kolmer's live virus was proven dangerous.

Studies of the value of intranasal medication during epidemics is the latest development in the study of the disease. Weak solutions of picric acid (1 per cent) alone, or with alum, instilled into the nostrils may have some direct action on the virus or may make the nasal mucous membrane less permeable to the virus. It seems distinctly worth trying during epidemics.

Blood Pressures for Ten Cents

A RATHER unusual conflict has recently arisen over the establishment of a booth at Coney Island where pleasure seekers are invited to pay ten cents and read their own blood pressures. A placard in the booth refers individuals to their family physicians for the interpretation of pressure readings.

As a consequence the State Department of Education in New York has asked the State Supreme Court to order this and other machines of the kind out of existence on the ground that their operation constitutes the practice of medicine.

We do not know for a certainty what the real purpose of the booth is—to collect dimes or to drum up practice for the medical profession. We are reminded of a publicity stunt inaugurated in Chicago some twenty years ago by the City Health Commissioner during Health Week whereby a high blood pressure apparatus with water substituted for mercury was set up in the City Hall and a continuous line of citizens awaited their turn at having their blood pressures taken. We suspect that certain individuals with high blood pressure derived considerable satisfaction in seeing the column of water rise up and up, some feet above normal levels.

We do not know what the decision of the New York Supreme Court will be. After all, the determination of blood pressure is a medical procedure and we do not know what effect a visit to Coney Island would have on blood pressures in general. Doubtless a ride on a roller coaster or ferris wheel, eating a "hot dog" or drinking pink lemonade would produce some effect. Assuming the blood pressure apparatus at Coney Island to be accurate, the readings probably would not represent true pressures.

Not to become too excited over the present

*Maxcy, Kenneth F.: Changing conceptions of the prevention of acute anterior poliomyelitis. *Am. Jour. Med. Sci.*, 192: 436, (Sept.) 1936.

controversy, seriously however, the estimation and interpretation of a blood pressure reading require some discrimination and experience. Many a patient has been needlessly alarmed by the improper interpretation to a patient of his pressure reading. A neurotic individual has not infrequently been thrown into a most distressing mental state of apprehension by the remarks of a medical adviser about the significance of an elevated blood pressure. It is likely that pressure readings at a place like Coney Island would cause more harm by unnecessarily alarming certain individuals than any good it might do in referring individuals with elevated pressure to their physicians for medical supervision.

After all, medical instruments in the hands of those not trained in their use are dangerous to the public welfare, even though they may be such seemingly innocuous instruments as manometers. It is to the credit of some of the manufacturers of medical instruments that they appreciate this fact and have refused to sell manometers to those outside the profession.

Positions For Doctors With the Civilian Conservation Corps Activity

At the present time there are a number of positions available with the Civilian Conservation Corps activity in the Seventh Corps Area for young men of the medical profession. Doctors having appointments in the Medical Corps Reserve of the Army and Navy may be ordered to duty under their commissions. Those who are not members of the Reserve Corps may be given appointments or they can be employed on a contract basis.

These positions offer the young physician an opportunity to get started in his profession and after a short time to begin his own private practice. Such training will give the medical profession a better insight on the manner of evacuating and caring for the sick and injured in a national emergency.

Those interested in obtaining positions as medical officers with the Civilian Conservation Corps may communicate with the CCC Surgeon, Headquarters Seventh Corps Area, Federal Building, Omaha, Nebraska.

Navy Medical Corps Examinations

Competitive examinations for appointments to the Medical Corps of the United States Navy will be held in December, 1936, and again in late May or early June, at the Naval Hospital, Great Lakes, Illinois; at the Naval Medical School, Washington, D. C., and at the Naval Hospital, Mare Island, California.

A candidate must be a citizen between the ages of

twenty-one and thirty-two, a graduate of a Class A medical school, must have had at least one year's internship in an accredited hospital. He is also required to pass a rigid physical examination and is required to certify that he is free from all mental and physical defects.

Further information may be obtained by addressing The Commandant, Ninth Naval District, Great Lakes, Illinois.

Serum Treatment of Acute Poliomyelitis

In more than one locality this summer the perennial question of the efficacy of convalescent serum in acute poliomyelitis will again be raised. A diagnosis of poliomyelitis can be established in a large percentage of cases days prior to the onset of paralysis, particularly during an epidemic. It is assumed that early diagnosis offers optimal conditions for effective treatment with convalescent serum. While it is contended by some that there is a smaller incidence of paralysis in the group of cases diagnosed in the preparalytic stage than in those seen after paralysis has set in, independent of serum administration, such a conclusion is not certain, as cases seen after paralysis frequently give a history of a prolonged preparalytic phase. However that may be, the practical results that have been obtained in three recent reports are alone enough evidence to warrant continued use of serum. Large doses of convalescent serum (100 c.c. or more) given intravenously and small doses (from 10 to 15 c.c.) intraspinally at the time of the spinal puncture are recommended. The intravenous dosage should be repeated in from twelve to twenty-four hours if the temperature is still elevated or symptoms are not subsiding. If future epidemic results can duplicate those of Jensen (Proc. Roy. Soc. Med., 28:1007, June, 1935), Clowie (Ann. Int. Med., 8:521, Nov., 1934), and Levinson (Illinois M. J., to be published), the treatment of acute poliomyelitis will be satisfactory and harmless to the patient. There is no other treatment that is even of debatable value. The early and continued use of orthopedic measures will improve results in the acute paralytic disease and in cases in which only paresis appears.—(J.A.M.A., Aug. 8, 1936, p. 432.)

The Antiscorbutic Factor in Cow's Milk

Twenty-four years ago Frolich demonstrated that cow's milk possesses antiscorbutic properties and his studies stimulated efforts to evaluate the amount of vitamin C contained in milk. Wide variations in vitamin C values are due to a number of influences, some beyond the control of the consumer and some which he can regulate provided he has interest and knowledge. Partial or complete loss of cevitamic acid (vitamin C) in milk is due chiefly, if not entirely, to oxidation, which may be induced by standing, by exposure to heat, light, air, and by the presence of metallic catalysts, especially copper. Nevertheless the experiments of King and Waugh have shown that the dairy industry may now produce pasteurized milk as rich in cevitamic acid as was the same milk in the raw state before pasteurization. In the interests of high milk production, rations fed can be uniform and of good nutritive quality at all times. Pasteurized milk likewise can supply not only uniform amounts but as much of this essential vitamin as fresh milk. Serious losses in the antiscorbutic factor may occur in the home or hospital as the result of such simple procedures as mixing or decanting. A significant decrease in vitamin C has been reported in milk that stood from six to eight hours in the dark, even though it was cold. Reheating milk also lowers its potency.—(J.A.M.A., Aug. 22, 1936, p. 589.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

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Your Standing Orders

Now is the time to consult your State Representative and your Senator. Ask him what his views are on all of the problems that concern Organized Medicine and the Public Health in Minnesota today.

THIS IS IMPORTANT. Do not neglect it.

Medical Co-operatives

Talk of medical coöperatives is in the air.

A Northwest farm organization is sending out printed instructions to its members on how to form a medical coöperative.

Requests for information about such coöperatives have been made from rural sections of Minnesota to the Attorney General; one plan suggested by a coöperative creamery was definitely disapproved.

A letter appeared within the last month in a rural weekly from a farmer whose son is now receiving complete care in a veterans' hospital, though he spent only a few months in a training camp in the United States during the war. Why should the veterans have this privilege, asks the farmer, when the rest of us have to pay our way?

For Cheaper Funerals

The farmer cites a coöperative in Economy, Indiana, as his answer. The Economy venture offers a fairly complete medical service, according to its Constitution and prospectus, for 68 cents a month for individuals and \$1.30 a month for families.

In Minneapolis, the Fidelity Service Association is a source of disquiet to funeral directors

because it is directed particularly at funerals for low prices. The contract has a provision for medical care at low prices, too, for its members. The funerals are to be secured, at the present time, from one establishment. The medical care is to be secured, too, from one so-called clinic which advertises in the newspapers and which is said to include among its members cultist practitioners. Membership is open only to Union members who pay a fee of \$1.00.

Not so Acute

Notwithstanding these isolated episodes in Minnesota and the friendly reception that the suggestion of coöperatives as the way out of all our current social ills received at the recent Minnesota Conference of Social Work, the question is not so acute—as yet—in Minnesota as it is elsewhere in this section.

Wisconsin is confronted, however, with the problem of an Interim Commission of the Legislature to study health insurance and costs of medical care in Wisconsin. What this commission may report and what reception the report may receive in the liberally inclined Wisconsin sessions remains to be seen. The well organized and alert Wisconsin State Medical Society is aware of the situation and its possibilities and may be relied upon, without doubt, to direct any resulting legislation into sound and proper channels.

More Social Security

The question of whether or not an attempt will be made to extend Social Security legislation to some form of sickness insurance at the forthcoming session of Congress is being discussed in many quarters. The answer waits, no doubt, upon the results of elections and also upon the

enlightenment and energy with which Organized Medicine maintains its stand.

How does the candidate from your district stand on these important questions?

Padding Bills

Two physicians in Minnesota have been investigated by G-men for padding and misrepresentation in bills submitted for medical care of injured WPA workers.

In these cases the charges are said to include gross misrepresentation among other more serious offenses of the number of calls made on one injured worker.

G-men made their investigation recently and the whole case awaits action in Washington.

Fortunately these two physicians are not members of the Minnesota State Medical Association, and were not approved by the Association for inclusion on the list of men accredited to do this work.

It is unthinkable, however, that any physician licensed to practice medicine in Minnesota, even if he is not a member of Organized Medicine, should be guilty of such a violation. The action of these men is a blot on the reputation of all medical men in the State.

In addition, they lay themselves open to certain detection and prosecution. This phase of WPA work is under the direct charge of the United States Employees Compensation Commission and is not subject to hasty or careless handling. Even small infractions and carelessness will be checked on by G-men and duly reported.

For their own sakes and for the sake of the high esteem in which the doctor should be held in every community, members of the Minnesota State Medical Association should lean over backwards to be meticulously careful and honest in their dealings with government agencies of whatever character, federal, state or county, that may be paying bills for medical care.

It should be obvious to all of us that the surest way to defeat all efforts toward a fair and economically sound arrangement for medical care of the indigent or needy is for anybody—even one irresponsible member—to lay himself open to the charge of profiteering at the expense of the government in the delivery of medical care.

Malpractice Rates Go Up!

(Monthly editorial prepared by the Medico-Legal Advisory Committee)

Insurance companies are steadily losing money on their malpractice insurance in Minnesota.

In many communities, the Aetna Casualty and Surety Company has paid out more money in the settlement of claims than it has taken in in premiums.

In one community, at least, the company is thinking seriously of retiring completely.

The Aetna Company, last to raise its rates, now announces an increase from \$29 to \$33 as the basic rate for \$10,000 and \$30,000 coverage for group insurance in Minnesota, effective immediately. The new rates are not to recoup past losses, the company says, but to pay for future losses.

There is no doubt, in view of the above statements made by an Aetna representative, that the malpractice situation is serious and that the entire membership of the Minnesota State Medical Association must unite with the Medico-Legal Advisory Committee in its efforts to improve it.

Ramsey's Record is Good

One curious phase of the situation lies in its unevenness. For example: Ramsey County shows an excellent record, no trouble at all; Hennepin County has only a fair record; St. Louis County has a much worse record with large amounts of money lost there; while Stearns County is worst of all.

Everybody Pays

In the last four years the Aetna Company says it has paid out \$10,000 in one small city alone. Result: The rates for all are raised.

What is to be done about the situation?

The Medico-Legal Advisory Committee has been pointing out the answer month by month. Physicians must do everything in their power to avoid malpractice litigation.

If the medical men of Ramsey County can avoid malpractice suits, the men in other counties can do so likewise.

Of course, there is no royal road to such a freedom and sometimes influences are at work that are wholly outside the power of the physician to control.

Avoiding Trouble

Both the doctors who have studied the matter and the insurance men are agreed, however, that the vast majority of suits can be avoided by scrupulous attention to the requirements of good medical practice and good record keeping for the physician in his own practice and an equally scrupulous care for the reputation of fellow practitioners.

The question of whether or not the Aetna Company is to withdraw from any one county and whether or not it will at some future time district the state so that some districts will be charged higher basic rates than others will be taken up in future conferences between the company, the Council and the Medico-Legal Advisory Committee.

Meanwhile the increase in basic rates of premium is now a fact. It goes into effect in all parts of Minnesota immediately.

* * *

In the case of Veronica Krummel vs. Dr. J. L. McLeod of Grand Rapids, Minn., the jury on September 16 returned a verdict for Dr. McLeod after being out but one hour. This is pleasing news to the many friends of Dr. McLeod in our Association.

Soule Again

Propaganda against immunization and vaccination has been pushed with a new vigor this fall.

In Minnesota, the source is the "National Health Foundation, Inc.," an organization whose existence seems to be restricted chiefly to news letterheads. The address given for this foundation is 341 Loeb Arcade, Minneapolis. This is the address of the *National Observer*, of which Mr. H. E. Soule, president of the foundation, is editor. The Soule Medical Company, which manufactures and sells a corn remedy, is also listed with the telephone company at that address.

Using the Newspapers

Pamphlets against diphtheria immunization, vaccination, and tuberculin testing have hitherto been distributed frequently, particularly at health meetings and in communities where a community effort to immunize or vaccinate or test the children for tuberculosis was in contemplation.

Now Mr. Soule is utilizing the Publicity Control Bureau of the Minnesota Editorial Associa-

tion to distribute news releases to all editorial association members of the state.

This Publicity Control Bureau is a purely commercial instrument of the editors designed to weed out advertising that masks itself as legitimate publicity material for the editorial columns of the newspaper. It exercises no censorship over the worth or truth of the reading matter; that type of censorship is left to the individual editor.

Bulletin to Doctors

The only notice taken by the Medical Association of the Soule onslaught was a bulletin to doctors issued by Dr. L. R. Critchfield, chairman of the Public Health Education Committee, urging representatives of county medical societies everywhere to discuss the whole matter with their local newspaper editors. The Committee hoped that, by informal discussions between physicians and editors, much might be gained in the way of a good mutual understanding and valuable education in preventive medicine.

The Committee and likewise the State Board of Health were agreed that a public answer to the Soule articles would merely invite further attacks.

As a result of one such conference, a complete editorial retraction of the Soule article appeared in the paper. The retraction, so named in a headline, was printed on the editor's own initiative. The original story had been used inadvertently and without intent of harm.

In many other cases, editors voluntarily called medical society representatives for advice and information before printing the Soule article.

The final result of this departure in publicity methods on the part of the "National Health Foundation, Inc.," is quite likely to be a much better understanding of the facts than ever before on the part of the newspapers.

Investigating the State Institutions

One of the most interesting and valuable pieces of public service ever undertaken by the Minnesota State Medical Association has just been completed by the Committee on State Health Relations, of which Dr. T. H. Sweetser of Minneapolis is chairman.

This was a survey of state institutions made by members of the Committee according to a

schedule drawn up by the Committee itself with advice from the State Board of Control.

The investigations were made independently of any official guidance or routing. The findings represent the observations of impartial medical men, uninfluenced by political considerations of any sort.

The final report was summarized and presented by Doctor Sweetser to the Council and, with the approval of the latter body, submitted to the State Board of Control with the recommendations of the Committee for changes or improvements wherever they seemed advisable.

Findings Complimentary

In general, the findings of these investigators were distinctly complimentary to Minnesota's system of institutions for the blind, the tuberculous, the feeble-minded, the insane, and the institutions of correction.

Most important of the recommendations made were those for better sewage disposal at several institutions and for better arrangements for utilization of the abundant material in all of the institutions for medical research. In a good many instances medical staffs are barely adequate for the routine care of patients and inmates and totally inadequate for research. Suggestions for closer coöperation with the University were made to the end that better use could be made of research material and that fellowships might be established in the state institutions.

Gillette 100 Per Cent

It was noted that only Gillette State Hospital for Crippled Children is approved by the American Medical Association for residencies among the state institutions in Minnesota and suggestions were made for extending this approval to other institutions in order to increase the working staffs of these institutions. Gillette hospital, it was found, is the only one among all of the institutions where a 100 per cent record of autopsies was maintained.

Members of the State Board of Control cordially welcomed the investigation and manifested an especial eagerness for the report.

There is no doubt that this type of survey should be made regularly by representatives of the practicing physicians of the state. In this, they fulfill a definite obligation, not only to their members but to the public. It is a function that should not be delegated solely to official bodies or to lay commissions to perform.

The Council Meets

Dr. A. J. Chesley, State Health Officer, reported to the Council that participation in Social Security appropriations for public health is proceeding satisfactorily with the organization of health districts now virtually complete. There are three at this date with headquarters at Duluth, Bemidji and Mankato.

Participation in maternal and child welfare benefits is proceeding but Washington had not yet determined the ultimate appropriation at the time of the meeting.

There is very little epidemic disease in the state just now and the small amount of poliomyelitis at this time indicates definitely that there will be no epidemic this year.

Dr. Chesley reported that, in decided contrast to the situation two years ago, there is a supply of biologics on hand and money is available for toxoid and vaccine. He offered the coöperation of the State Board of Health in any effort that might be made, with the approval of the Council, to encourage vaccination and immunization in the state.

A description of plans for the Refresher Courses to be financed by Social Security funds was given to Council members by Dr. E. C. Hartley, Director of the Division of Child Hygiene.

The course as now outlined would be divided between obstetrics and pediatrics. It would be given in three series or "circuits" of six lectures each. These circuits are to be held in different parts of the state. Each lecture would begin at four-thirty in the afternoon to be followed by dinner and an hour or an hour and a half of evening instruction. Registration would be free.

The Council voted unanimously to coöperate with Dr. Chesley and the State Board of Health in an effort to extend immunization and vaccination through the Committee on Public Health Education of which Dr. L. R. Critchfield is chairman.

Refresher Courses

The plans for the Refresher Courses were heartily approved, also, and the Committee on Hospitals and Medical Education of which Dr. C. A. McKinlay is chairman, and the Committee on Maternal Welfare of which Dr. R. D. Mussey is chairman, were designated to work with Dr. Hartley and the State Board of Health.

Dr. K. F. Maxcy, recently of the University of Virginia and newly appointed head of the Public Health Training Center for this region at the University of Minnesota, was introduced to the members of the Council by Dr. H. F. Diehl, Dean of Medical Sciences.

This center will take full advantage of the close association between the Department of Health and the Medical School. It will be in the nature of a post-graduate section rather than a separate school, according to Dr. Maxcy.

Malpractice

The current crisis in the malpractice insurance situation which has prompted the boosting of malpractice rates (referred to elsewhere in these columns) was described in detail by Dr. B. J. Branton, chairman of the Medico-Legal Advisory Committee.

The question of possible disciplinary measures for members who instigate malpractice litigation was discussed and Council members directed Dr. Branton to take the matter up with the Committee on Public Policy and Legislation, Dr. L. L. Sogge, chairman.

The Council also directed Dr. Branton, Dr. W. L. Burnap, member of the Committee, and Secretary E. A. Meyerding to investigate the new plan for handling malpractice insurance recently put into effect by the New York State Medical Society.

The Committee on Public Health Education will prepare a series of leaflets on preventive medicine, generally, and particularly on diphtheria protection and smallpox vaccination to be sent out with doctors' bills. These leaflets will constitute part of the general campaign to be carried on by the state association for more and earlier protection against disease.

The Council approved.

Minnesota State Board of Medical Examiners

Minneapolis Naturopath Sentenced to Four Years in Prison

State of Minnesota vs. George R. Viger

On September 15, 1936, "Dr." George R. Viger, fifty-one years of age, entered a plea of guilty in the District Court of Ramsey County, to an information charging him with the crime of abortion. He was sentenced by the Honorable Hugo O. Hanft to a term of not to exceed four years in the State



Prison. Viger was arrested on August 7, 1936, at 421 Clifton Avenue, Minneapolis, following the death of a twenty-seven year old St. Paul woman at Ancker Hospital. Val Do Turner, a sixty-nine year old negro physician with offices in St. Paul, was also named in the complaint signed by the husband. Dr. Turner is at liberty on a \$5,000 bond to appear at the next term of the District Court, and is also under citation before the State Board of Medical

Examiners to show cause why his license should not be revoked.

Prior to 1931 Viger maintained an office in the Bremer Arcade in St. Paul. At that time he was representing himself as a naturopathic physician. He was arrested on a charge of practicing healing without a basic science certificate and pled guilty on December 10, 1930. He was sentenced to pay a fine of \$200 and to serve a year in the St. Paul Workhouse. The fine was paid and the Workhouse sentence was suspended on condition that Viger refrain from practicing healing. He closed his office after informing the Court that he was moving to Texas. He did not leave the state, however, and at the time of his last arrest was found to be living at a Minneapolis hotel. A twenty-six year old Minneapolis girl was found in the Clifton Avenue place when the raid was made. She stated that she had been aborted by Viger the day before and had paid him the sum of \$190.00 in cash. The evidence obtained by the Medical Board in cooperation with the Police Department of St. Paul and Minneapolis, indicated that a considerable number of illegal operations had been performed at this place since May, 1936.

The State Board of Medical Examiners is very grateful for the cooperation received from the Police Department of St. Paul and Minneapolis. The evidence obtained in this case made it practically impossible for the defendant to stand trial. The Board also wishes to acknowledge the usual high grade cooperation received from Mr. M. F. Kinkead, County Attorney, and his staff. The sentence imposed by Judge Hanft should discourage quackery and unlawful practices in the field of healing. Counsel for the defendant asked Judge Hanft to limit the sentence to two years, but the Court refused and imposed the penalty provided by law for abortion.

OF GENERAL INTEREST

Dr. L. E. Sjostrom, a recent graduate of the University of Minnesota, has located in Storden, Minnesota.

* * *

Following the completion of his internship at the Miller Hospital, Saint Paul, Dr. Alden Risser recently began practice at Stewartville, Minnesota.

* * *

Dr. Royal C. Gray and Miss Mary Halverson were married in September. Dr. and Mrs. Gray are now at home at 115 Bedford Street S. E., Minneapolis.

* * *

Dr. Herman J. Kooiker has moved from Milaca, Minnesota, to Hill City, Minnesota, where he will continue the practice of medicine.

* * *

Dr. C. W. More, of Eveleth, who was operated on the latter part of August for a ruptured appendix, has recovered nicely and has resumed his practice.

* * *

There is an opening for a physician in Middle River, Minnesota. Inquiries may be sent to the local drug store or bank.

* * *

Dr. E. W. Arnold of Adrian has recently purchased residence property at Adrian to be converted into a hospital for the community.

* * *

There is an opening for a physician and surgeon at Dunnell, Minnesota. Correspondence should be addressed to the First National Bank, Dunnell, Minn.

* * *

Dr. Carleton Strathern, who received his degree in medicine from the University of Minnesota last spring, has become associated in the practice of medicine with his father, Dr. F. P. Strathern, in St. Peter, Minnesota.

* * *

Dr. Homer Basinger was recently appointed city health officer of Windom, Minnesota, to fill the vacancy caused through the resignation of Dr. A. L. Pertl, who is leaving the community.

* * *

Dr. W. J. Sahr of Hutchinson, Minnesota, is making a name for himself in golf circles, having won the championship of the Hutchinson Golf Club for four years in succession.

* * *

Dr. A. F. Branton of Willmar was elected District Governor of the Minnesota-Dakotas district of the Kiwanis Club at the nineteenth annual meeting held in Rochester, Minnesota, the latter part of August.

* * *

Dr. Arthur Thompson of Cokato is taking a post graduate course in surgery and radiology at Northwestern University, Chicago. He will return to his practice early this month.

* * *

Dr. Wallace P. Ritchie completed his fellowship at the University of Minnesota in July, and in August

became associated with his father, Dr. Harry P. Ritchie, 914 Lowry Medical Arts Building, Saint Paul. His practice will be limited to general surgery.

* * *

Dr. H. H. Holm was awarded the medal of the Southern Minnesota Medical Association for presenting the most interesting case report at the annual meeting held at Albert Lea, in August. His subject was "Siamese Twins."

* * *

Word has been received of the death of Dr. J. De Motte Guthrie, which occurred in Seattle, Washington, September 18, 1936. Dr. Guthrie was a graduate of the University of Minnesota in 1897 and practiced at La Verne, Minnesota, until 1903, when he moved to Seattle.

* * *

Dr. Richard F. Herbst of Minneapolis and Miss Harriet Marie Scoles of Minneapolis were married September 9, 1936. Following a motor trip east and south they will be at home this month at 4728 Minnehaha Avenue, Minneapolis.

* * *

Dr. and Mrs. E. J. Simons have returned to their former home in Swanville after spending the past fourteen months at Ah-Gwah-Ching where Dr. Simons made an intensive study of tuberculosis at the Sanitarium there.

* * *

The marriage of Dr. Herbert L. Stolpestad of Saint Paul and Miss Flora S. Corum of Waltham, Massachusetts, was solemnized in Trinity Church, Boston, August 19, 1936. Dr. and Mrs. Stolpestad are now at home in Saint Paul at 652 Mound Street.

* * *

Correction.—In our last issue the name of one member of the committee of psychiatrists appointed to determine the mental status of prisoners at the State Penitentiary at Stillwater was incorrect. The committee is composed of Dr. Joseph C. Michael, Minneapolis, Dr. E. M. Hammes and Dr. Gordon R. Kamman, Saint Paul.

* * *

Word has been received of the death of Dr. Mary Hopkins Brandrup of Mankato, who died at the age of sixty-six, August 25, 1936. Dr. Brandrup some years ago was woman physician at the St. Peter Hospital for the Insane. She is survived by her husband, Professor J. R. Brandrup of Mankato.

* * *

Dr. J. A. Bargaen and Mrs. Bargaen left September 19 for an extended trip in Europe. Dr. Bargaen will address the Medical Society of Holland, in Amsterdam, October 18, and the Royal Society of Medicine, in London, October 21. He plans to visit clinics in England, Germany, Holland and Italy before returning home.

* * *

The marriage of Dr. James A. Blake, son of Dr. and Mrs. James Blake of Hopkins, Minnesota, and Miss Ruth Sarah Hanford, daughter of Mr. and Mrs. Arthur Hanford of Duluth, will take place October 17 in Du-

Duluth. Dr. Blake is associated in practice with his father in Hopkins, where he and his bride will make their home.

* * *

Dr. O. J. Hagen of Moorhead, Minnesota, president of the Governing Boards of State Universities, represented the Board at the Harvard Tercentenary, Harvard University, September 18. On the way he attended the Cancer Conference at Madison, Wisconsin, and also visited the Memorial Cancer Hospital in New York. Dr. Hagen is a member of the Cancer Committee of the Minnesota State Medical Association.

* * *

The physicians from the Mineral Springs Sanatorium group, which includes Goodhue, Dakota, Rice, Olmsted, Freeborn and Mower Counties, held their annual dinner meeting at the Sanatorium on September 8, 1936.

Dr. Porter P. Vinson, of the Mayo Clinic, spoke on "Importance of Physical Signs in the Differentiation of Inflammatory and Malignant Pulmonary Lesions." Dr. Everett K. Geer, of St. Paul, discussed "Silent Parenchymal Lesions," and showed lantern slides. Dr. E. J. Keplar, of the Mayo Clinic, talked on "Diabetes and Tuberculosis." Dr. T. J. Kinsella, of Glen Lake Sanatorium and Minneapolis, discussed "Empyema" and showed slides.

* * *

The next written examinations and review of case histories of Group B applicants by the American Board of Obstetrics and Gynecology will be held in the various cities in the United States and Canada on Saturday, November 7, 1936, and on Saturday, March 6, 1937.

The next general examination for all candidates (Groups A and B) will be held in Atlantic City, N. J., on June 8 and 9, 1937.

Application blanks and booklets of information may be obtained from Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania. Applications for these examinations must be filed in the Secretary's office not later than sixty days prior to the scheduled date of examination.

* * *

Members of the Minnesota State Medical Association who wish to read papers before the 84th annual session of the State Medical Association in Saint Paul, May 3, 4 and 5, 1937, are asked by the Committee on Scientific Assembly to send their requests as promptly as possible to Association headquarters, 11 West Summit Avenue, Saint Paul, Minnesota.

The Committee held its first meeting September 19. The members are: *Officers*—A. W. Adson, Rochester; H. W. Goehrs, St. Cloud; Dr. E. A. Meyerding, Saint Paul. *Section on Medicine*—A. H. Beard, chairman, Minneapolis; H. R. Hartman, secretary, Rochester; A. Gullixson, Albert Lea. *Section on Surgery*—M. W. Alberts, chairman, Saint Paul; F. H. Magney, secretary, Duluth; C. O. Estrem, Fergus Falls. *Clinical Demonstrations*—W. A. O'Brien, Minneapolis. *Local Arrangements*—W. R. McCarthy, general chairman, Saint Paul.

In Memoriam

G. G. Morehouse
1876-1936

DR. G. G. Morehouse of Owatonna died suddenly from heart disease at his apartment September 2, 1936. He was sixty years old and had retired from practice several years ago.

Dr. Morehouse was a son of Dr. E. M. Morehouse, Owatonna's first physician and surgeon, and at one time mayor of the city of Owatonna.

Serving as county coroner for four years and as mayor in 1914, Dr. Morehouse was active in Red Cross work, was chairman of the Steele County Public Safety Committee and a leader in the Owatonna better housing movement. After twenty years of active practice he devoted much of his energy to the beautification of Morehouse Park, a picnic and recreational park in the city, given in memory of his father.

Dr. Morehouse is survived by one sister, Mrs. John Adsit of Owatonna, and a brother, Dr. E. M. Morehouse of Yankton, South Dakota.

Richard Olding Beard
1856-1936

ONE day shortly before he died, Dr. Beard eluded his attendant, got himself dressed, went by streetcar to the University, pursued his usual pathway to Millard Hall, followed its corridors so often trod by him and doubtless stopped to glance at old class pictures, nearly every individual in which he knew. He went to the dean's office and talked for a time with Dr. Diehl. Here he was located by anxious friends and induced to go home to bed.

This episode is emblematic of the man and illustrates his two great qualities, loyalty and enthusiasm. The prime object toward which these qualities were directed was the Medical School of the University of Minnesota. He was the last of the old wheel horses of that institution and one of its staunchest supporters.

He was born in England in 1856, came to the United States at the age of thirteen and grew up in Chicago. He graduated in Medicine from Northwestern University in 1882 and came at once to Minneapolis to engage in practice.

But practice soon became a secondary or tertiary interest. From about 1883, when he became connected with the Minnesota Hospital Medical College, to the day of his death, it may be safely said that the overwhelming object of his thought and effort was medical education in Minnesota. During a period of more than fifty years no plan or proposal affecting this activity was ever advanced that did not receive either his enthusiastic support or his cogent criticism.

To such a man it could only happen that the history of every movement in medical education in this state bears traces of his influence. The bringing together of proprietary medical colleges in 1888, under Dean Millard, as the Medical School of the University; the

final union with Hamline University Medical Department and the unification of medical education in Minnesota—this under Dean Westbrook in 1908; the campaign for a new medical campus and building of the new medical school and hospital; the admission of nursing to full university recognition; the organization in the University of Minnesota of graduate medical teaching, amalgamation with the Mayo Foundation and affiliation with the Mayo Clinic; the adoption of the full-time plan in clinical departments; the gradual enlargement of the budget and strengthening of the faculty; the numerous improvements in laboratory and clinical teaching; all these were movements in which Dr. Beard had a part and in some of which, for example, the foundation of the first University Nursing School and its later extension into four hospitals, he was the prime factor.

Secondary to education in his interest and activity was public health. He was Assistant Commissioner of Health in Minneapolis from 1886 to 1889. He was a member of the commission which canvassed sources of water supply for the city and finally settled upon the Mississippi river with appropriate chemical treatment and filtration. After his retirement from teaching on reaching the University age limit in 1925, he was active for several years as Executive Secretary of the Health Council of Minneapolis and Hennepin County. He was a member of the American Public Health Association and was active in the field of Public Health Nursing.

He was Professor of Physiology in the Medical School from 1888 to 1925; Head of the Department, 1888-1913; Emeritus Professor, 1925-1936. He was Secretary of the Medical School most of the time from its founding to 1920.

He was a member of numerous medical, public health and hospital societies, and at one time was President of the Minnesota Academy of Medicine. His work in nursing education was recognized by honorary membership in the National League of Nursing Education.

He was a prolific and influential author. He once told the writer that he was raised in a book store. Perhaps through this influence he developed a meticulous classical style of composition. His numerous papers and addresses on medical and nursing education could be searched in vain for solecism or slang.

He was essentially historically minded, a believer in the written word, a builder of records and files, a stickler for minutiae. The volumes of minutes of faculty and committee meetings which he left behind constitute a mine of information as to every phase of thought or action prevailing in the Medical School for almost half a century. He loved to write constitutions and plans of organization. He also spoke forcibly and well.

During the last four years of his life he was engaged in writing a history of the Mayo Clinic and Foundation. If, as this writer suspects, this work is unfinished, we may be certain that this is due to Dr. Beard's unflinching pursuit of detail. Not one date, number or smallest fact would he set down until after the fullest verification. He abhorred sketchy outline and summary. These traits demonstrate intellectual honesty of a high type.

The last of the founders of the Medical School of the University of Minnesota has gone. They were aggressive representatives of a pioneer age. They knew what they wanted and fought for it. If they lacked science, they were not failing in imagination, enthusiasm or hard work. Dr. Beard was worthy of a place in this company.

May the school enlist in its service for all time men of vision, as enthusiastic, loyal and wise as these founders.

E. P. LYON

WOMAN'S AUXILIARY

MRS. E. M. HAMMES, *President*,
1456 Summit Avenue, Saint Paul
MRS. A. A. PASSER, *Editor, Press and Publicity*, Olivia

Interstate Postgraduate Medical Assembly— Women's Entertainment

Sunday, October 11:

4:00 to 7:00 P. M. Informal buffet supper. Honoring officers and chairman Interstate Post Graduate Assembly. Home of Mrs. William H. Von der Weyer, Gray Cloud Island, St. Paul Park.

Monday, October 12:

9:00 A. M. Registration—St. Paul Hotel.
3:00 P. M. Drive and Tea—Complimentary.

Tuesday, October 13:

12:30 P. M. Luncheon and Style Show—St. Paul Athletic Club.
8:00 P. M. Bridge—Medical Arts Library—Complimentary.

Wednesday, October 14:

10:00 A. M. Meeting, followed by Luncheon for Members of Board of Minnesota State Medical Auxiliary. Home of Mrs. E. M. Hammes, 1456 Summit Ave., St. Paul.
12:30 P. M. Luncheon—St. Paul Hotel.
3:00 P. M. Drive and Tea at College of St. Catherine. Cars leave from Hotel St. Paul.
8:00 P. M. Joint Dinner—Lowry Hotel.

Thursday, October 15:

12:30 P. M. Luncheon—Lowell Inn, Stillwater.
12:30 P. M. Luncheon—Women's City Club, St. Paul.
3:00 P. M. Drives and Tea—Complimentary.

Friday, October 16:

A. M. Golf
Tours
1:00 P. M. Luncheon—Somerset Country Club or Town and Country Club.

* * *

Mrs. E. M. Hammes, president of the Woman's Auxiliary, and Mrs. S. S. Hesselgrave, attended the Northern Minnesota Medical Association meeting held at Fergus Falls, August 31. The Auxiliary members were entertained at a luncheon at which Mrs. Hammes and the president-elect, Mrs. J. F. Norman of Crookston, were speakers.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Inter-state Postgraduate Assembly

The International Medical Assembly of the Inter-State Postgraduate Medical Association of North America will be held October 12 to 16, 1936, at the Auditorium in Saint Paul. Pre-assembly clinics will be held in the Saint Paul hospitals on October 10, the Saturday preceding the Assembly, and post-assembly clinics on October 17, the Saturday following the five-day program.

The scientific program will begin each morning at 8 a. m., each afternoon at 1 p. m. and each evening at 7 p. m. Registration may be made on the Sunday preceding the Assembly at the registration desk in the Saint Paul or the Lowry Hotels, or on Monday at the Auditorium. Registration is necessary and is open to members of county, state, provincial and Dominion societies. Members of the dental profession are cordially invited to attend as well as nurses, internes and medical students. Members are urged to have their ladies register also. The public in general is not invited.

An informal Assembly dinner will be held Wednesday evening to which physicians, their ladies and friends will be welcome.

The scientific program includes a wide variety of subjects and there will be four speakers from the British Isles, one from Canada, and an array of well known medical authorities from other states.

Dr. David Riesman, Philadelphia, is president of the organization and Dr. W. B. Peck, Freeport, Illinois, is the managing director.

Northern Minnesota Medical Association

At the sixteenth annual meeting of the Northern Minnesota Medical Association held at Fergus Falls, Minnesota, August 31 and September 1, the following officers were elected for the coming year: President, O. O. Larsen, Detroit Lakes; vice president, E. A. Heiberg, Fergus Falls; secretary-treasurer, J. F. Norman of Crookston.

At the State Hospital on Monday evening the doctors, their wives, and guests were entertained at a banquet by the Park Region Medical Society and Dr. and Mrs. W. L. Patterson. Dr. Patterson is superintendent in charge of the hospital. Dr. W. L. Strunk, of Decorah, Iowa, chairman of Iowa's Basic Science Board, director of Iowa Conservation Board and Dean of the Biology Department at Luther College in Decorah, was the guest speaker. His address entitled "Our Vanishing Hosts" was a severe indictment of the American people for the gross indifference with which they allow the surface of the earth to be destroyed. Dr. Strunk stated that the destruction of our natural resources is going on at a terrific pace; Iowa alone sends a cubic mile of its top soil to the ocean every year. One very effective point brought out by the speaker was the fact that we have

nothing but deserts today, wherever humanity has lived longest and cultivated the soil. As witness he mentioned the Gobi desert, Mesopotamia, the hill country of China, once the most fertile region of the earth. As an effective remedy he recommended the organization of local clubs or associations somewhat like the American Wild Life Federation, whose aim would be to save the remaining 20 or 25 per cent left of our natural heritage. If our remaining natural resources are to be saved and rebuilt, said Dr. Strunk, the work will have to be done by means of an aroused public opinion acting through these various organizations. Dr. Strunk can be classed as an outstanding conservationist and has a message well worth hearing.

Interesting short addresses were given by the veteran toastmaster, Dr. O. J. Hagen, in his usual witty way, and by the president of the State Medical Association, Dr. W. W. Will of Bertha.

The president, Dr. A. N. Collins, concluded the banquet program with an outstanding address entitled, "The Doctor," making a strong plea for better co-operation between doctors and a higher standard of medical ethics.

Next year's convention city has not been definitely decided upon.

O. O. LARSEN, *Secretary-Treasurer.*

Stearns-Benton Counties

Members of the Stearns-Benton County Society residing in Sauk Center were hosts to the Society at the regular September meeting held in Sauk Center, September 17. Guests outside the membership included physicians from Long Prairie, Osakis, Glenwood and Starbuck.

The meeting opened with a dinner at White Swan Inn on Sauk Lake and was followed by a scientific program which included the following papers:

"Some Neuropsychiatric Considerations in Cases of Trauma—Accidental Injuries"—JOSEPH C. MICHAEL, M.D., Minneapolis.

Discussion—HUGO MELLA, M.D., Director of U. S. Veterans Hospital, St. Cloud, and C. B. LEWIS, M.D., St. Cloud.

"Cardiac Disorders of Particular Interest to the General Practitioner"—OLGA S. HANSEN, M.D., Minneapolis.

Discussion—C. S. DONALDSON, M.D., Foley, and H. P. CLARK, M.D., St. Cloud.

Washington County

The regular monthly meeting of the Washington County Medical Society was held September 8, 1936.

Dr. E. A. Brown of the Mayo Clinic, Rochester, gave a very instructive interesting talk on "Jaundice."

Dr. Francis Michael McCarten of Stillwater, having been favorably reported on by the Society Censors, was elected to membership.

E. SYDNEY BOLEYN, *Secretary.*

MINNESOTA STATE MEDICAL ASSOCIATION*

EIGHTY-THIRD ANNUAL MEETING

May 3, 4, 5 and 6, 1936

Rochester, Minnesota

HOUSE OF DELEGATES

First Meeting

Sunday evening, May 3, 1936

THE first meeting of the House of Delegates of the Eighty-third Annual Session of the Minnesota State Medical Association, held at the Kahler Hotel, Rochester, May 3 to 6, convened at 7:20 p. m., May 3, Dr. W. W. Will, Bertha, president, presiding.

The president announced the appointment of the Committee on Credentials including: Dr. E. G. McKeown, Pipestone, chairman; Dr. C. A. Stewart, Minneapolis, and Dr. B. A. Smith, Crosby.

Minutes of the Council were read by Secretary Meyerding and it was moved by Dr. W. A. Coventry, regularly seconded and carried that this report be received and the articles discussed therein be discussed by the delegates.

REPORT OF THE COUNCIL

The opening session of the Council, held in connection with the Eighty-third Annual Meeting of the Minnesota State Medical Association, Rochester, convened at 9:50 a. m., Sunday, May 3, Dr. H. M. Workman, Tracy, Chairman of the Council, presiding.

The following were present:

President, W. W. Will, Bertha
Secretary, E. A. Meyerding, St. Paul
Treasurer, W. H. Condit, Minneapolis
Past President, W. A. Coventry, Duluth
First District.....H. Z. Giffin, Rochester
Second District.....L. L. Sogge, Windom
Third District.....H. M. Workman, Tracy
Fourth District.....J. S. Holbrook, Mankato
Fifth District.....G. A. Earl, St. Paul
Sixth District.....J. M. Hayes, Minneapolis
Seventh District.....E. I. Simons, Swanville
Eighth District...W. L. Burnap, Fergus Falls
Ninth District.....B. S. Adams, Hibbing

The minutes of the last meeting were accepted as published.

It was moved by Dr. Coventry, seconded by Dr. Giffin and carried, that the financial report of MINNESOTA MEDICINE be received as presented by Secretary Meyerding.

The financial report of the Fiscal Agency was presented by Dr. Giffin. It was moved by Dr. Earl, seconded and carried, that the Finance Committee has the approval of the Council in selling the LaSalle Realty Corporation bond at its par value and accrued interest. It was further moved by Dr. Earl, seconded and carried, that the Council continue to authorize the Finance Committee with power to act regarding sale and investment from Council meeting to Council meeting.

Dr. H. E. Hilleboe, Director of the Tuberculosis Division of the State Board of Control, appeared before

the Council and outlined the program for expenditures of Social Security Funds for crippled children. Council members asked Dr. Hilleboe to outline the plan before the House of Delegates.

The report of the treasurer was presented by Dr. Condit and accepted.

REPORT OF TREASURER

Minnesota State Medical Association Statement of Cash Receipts and Disbursements for the Year Ended December 31, 1935

CURRENT FUNDS

Cash on Hand, December 31, 1934.....	\$ 9,479.78
Cash Receipts, Year 1935:	
Dues collected, year 1934.....	
and prior	\$ 268.75
Dues collected, year 1935.....	29,077.50
Dues collected, year 1936.....	3,090.00
Total dues collected.....	\$32,436.25
Interest on savings account.....	161.81
Sale of diabetes books.....	147.89
Bruce Publishing Co.....	250.27
Sundry items	.75
Transferred from Technical Exhibit Fund for credit of Annual Meeting expense.....	2,000.00
Total receipts	34,996.97

\$44,476.75

Cash Disbursements, Year 1935:

Special committees:	
Diabetes	\$ 25.80
Educational fund.....	10,952.57
Historical	1,073.65
Hospital and medical education.....	33.03
Medical Economics.....	1,464.20
Public Works Administration.....	203.28
Public health education.....	3,225.33
Radio	404.63
State Emergency Relief Administration	2,020.00
State health relations.....	28.69
Unbudgeted committees.....	109.97
Minnesota Medicine.....	4,083.40
Furniture and fixtures.....	78.45
Dues refunded	19.75
Administrative expenses:	
Annual meeting.....	\$ 4,087.27
Conferences:	
A.M.A. delegates.....	216.76
President's contingency fund	210.44
Other	310.65
Council expenses.....	415.42
County Officers' Meeting.....	449.65
Legal expense.....	1,051.89
Miscellaneous expenses.....	283.19
Office supplies and postage.....	658.52
Printed matter.....	676.17
Rent	384.00
Secretary's salary.....	4,200.00
Secretary's travel expense.....	480.44
Stenographic service.....	3,188.31
Telephone and telegraph.....	717.20
Treasurer's salary.....	100.00
Total disbursements.....	\$17,429.91

41,152.66

Cash on Hand, December 31, 1935..... \$ 3,324.09

Report of the Legislative Committee was presented by Dr. Sogge. It was moved by Dr. Earl, seconded and carried, that the Council reaffirm its confidence in Dr. Sogge and his committee, and that it is in full accord with the plans as reported by Dr. Sogge for his committee.

*The Proceedings are printed here in condensed form. They are on file in full at the Secretary's office and may be consulted there.

On motion of Dr. Hayes, regularly seconded, it was voted that the Council approve the following recommendations for submission to the House of Delegates:

"The following considerations are regarded as fundamental to good care in Minnesota and are recommended by the House of Delegates of the Minnesota State Medical Association in session at Rochester on May 3, for inclusion in the new relief and welfare legislation that is now being drawn up for enactment by the state legislature.

"1. That the proposed County Welfare Plan provide for medical care for the indigent poor; that the patient be allowed free choice of physician and that payment for this care be declared explicitly to be the responsibility of the county in which the patient resides.

"2. That the so-called 'county plan' for care of the indigent is preferable to the township plan and that legislation should be enacted at the next session of the legislature requiring all counties to operate on a county Board of Welfare plan.

"3. That legislation must be enacted to permit state funds to be used to supplement county funds for care of the indigent."

The proposed revision of the Constitution was taken up for consideration, preliminary to meeting with the Reference Committee to discuss the matter.

The meeting recessed at 12:35 o'clock.

* * *

The Council reconvened Sunday afternoon at 2:15. It was moved by Dr. Giffin, seconded and carried, that the meeting place for 1937 be considered for St. Paul, provided satisfactory arrangements can be made.

Chairman Workman announced that the paid membership showed an increase of 51 over the same period for 1935. Junior membership was discussed and Dr. Sogge stated that the Committee on Affiliate Membership recommended the matter be dropped.

Three resolutions were introduced and each, on motion of Dr. Coventry, was adopted for submission to the House of Delegates for consideration.

The first resolution urged county commissioners and welfare boards to assume the responsibility for medical, dental, surgical or hospital assistance and nursing care for the aged, mentioned in the old age pension law as allowed to pensioners.

The second expressed the appreciation and gratitude of the association to Mr. L. P. Zimmerman, State Relief Administrator, for his work in laying a foundation for an adequate and sound system of medical care for the indigent sick in Minnesota and his understanding shown toward the problem of the doctors.

The third expressed the gratitude of the association to Mr. Victor A. Christgau, WPA State Administrator, and his staff for the manner in which they have recognized the local practicing physician and their willingness to consult with physicians before shaping policies of the administration.

In considering the solicitation and disposition of funds for the Herman M. Johnson Memorial Fund, it was the opinion of members that a sum of \$2,000 should be raised, if possible, to establish a lectureship on medical economics, and that a letter of solicitation be sent out stating the use to which it was proposed to put the fund. It was also agreed that the moneys now in the Memorial Fund be transferred from a checking account to a savings account.

The matter of introducing a law, whereby a coroner could give permission for an autopsy, was referred to the Legislative Committee on motion of Dr. Coventry.

The following were nominated as delegates to the American Medical Association for the years 1937 and 1938:

Delegates		Alternates	
W. A. Coventry, Duluth		G. A. Earl, St. Paul	
W. F. Braasch, Rochester		W. L. Burnap, Fergus Falls	

Amendment to the Constitution, Article IV, Section 4, on affiliate membership as introduced by Dr. Sogge,

was brought to the attention of the Council, to be acted upon at the meeting of the House of Delegates.

A letter from Mrs. Hanson, Chairman of the Health Committee for the Minnesota Federation of Women's Clubs, was read. It was moved by Dr. Coventry, seconded and carried, that the Council authorize Dr. Martin Nordland, as chairman of the Committee on Cancer to coöperate with the Health Committee of the Federation of Women's Clubs.

A letter from E. R. Wright of Bagley, concerning the writing of liquor prescriptions, was read. It was the sentiment of the Council that such prescriptions might be typewritten, provided the doctor's signature was affixed thereto.

Other routine business, including approval of individual applications for affiliate membership, remittance of dues, etc., were handled in the usual manner and the Council then went into joint session with the Reference Committee.

ELECTION OF SPEAKER

It was suggested by President Will, that as a preliminary step looking toward the revision of the Constitution, which provides for a Speaker of the House of Delegates, the House of Delegates immediately elect a Speaker. It was recommended by the Reference Committee that this suggestion be adopted and was so moved by Dr. Hultkrans, seconded and carried.

Dr. O. E. Locken was nominated as Speaker by Dr. M. C. Piper, seconded by Dr. Burnap. On motion of Dr. Sogge, seconded and carried, nominations were closed and the Secretary cast a unanimous ballot for Dr. Locken as Speaker. Dr. Locken assumed the chair.

In accordance with the recommendation of the Reference Committee, the following reports were accepted by the House of Delegates.

REPORT OF THE PRESIDENT

Dr. Will pointed out that 1936 is a crucial year—a critical time for the medical profession. Whatever doctors do now or fail to do now will decide whether American medicine is to follow some other lines of human endeavor into grooves set by socialism and mass production.

The hope of medicine, he pointed out, lies in organization and organized activity. It lies in laying hold of this immediate problem of medical care of the poor and handling it wisely and well in accordance with one united policy. It lies in keeping legislators informed on medical facts and being fair and reasonable in all dealings with official agencies.

In all his relations with his fellow man, he declared, the doctor must be a little more than human. If he is not a little more trustworthy, a little more conscientious, a little more gentle and kind, then he has no place as a doctor.

REPORT OF THE SECRETARY

The Secretary reported that 1936 has seen an unexampled extension of the work of the Association and touched on the following highlights:

Medical Relief.—The return to the individual counties of responsibility for all direct relief came abruptly with the withdrawal of federal funds and the beginning of work relief. Medical care was among the responsibilities put up squarely to the commissioners of each county. This contingency had been foreseen by officers and Councilors, and the Committees of Three were organized with the objective of having ready a

close contact to make satisfactory readjustments when the SERA should end. Many of the counties were so ready.

For those counties which had not been so successful, assistance was needed. To provide this assistance and also to aid the Secretary and enable the State Office to maintain a close contact with the multiple government agencies, Mr. R. R. Rosell of Minneapolis was engaged with the approval of the Council.

As a result of Mr. Rosell's work, several adjustments have been made, including among them: medical care in transient camps given to local physicians on a fee basis; official endorsement by SERA of the medically approved plan of free choice of physician for indigent and payment to physicians on a fee basis. Mr. Rosell has visited thirty-nine counties to discuss plans for medical care of the indigent. It should be noted that special and unusual methods for treating the indigent in any part of the state, while they may appear to benefit the specific community served, are likely to cause confusion and lead to unnecessary difficulties.

Social Security.—The practice of medicine in Minnesota will be affected at many points by the Social Security program. The Minnesota Old Age Pension Law provides specifically for medical care in addition to pensions. This care must be provided by local county boards. Physicians should be familiar with this law and negotiate with county officers accordingly.

Two Titles of the Social Security Act, five and six, deal with Public Health, Maternity, Child Welfare and Crippled Children's programs. In all of these the practicing physician has a great interest. The Council of our association will act as advisory committee to Dr. A. J. Chesley in the administration of the program under Title Six. Dr. R. D. Mussey represents the association on the Advisory Committee for the Maternal and Child Welfare Program. Dr. Coventry is also a member of the committee.

Immunization and other preventive and diagnostic procedures will, no doubt, assume a place of prominence in this program. It is especially important that physicians be prepared to assist. Experience has shown there is need for more uniformity in the reading of diagnostic tests. Extensive demonstrations have been arranged on this subject for this meeting.

The importance of close coöperation on the part of each individual county medical society with local bodies in the operation of this Social Security health program cannot be stressed too strongly.

High School Debates.—Results of our efforts to assist high school debaters on state medicine have not been satisfactory. We do not know whether this has been due to lack of effective material from the state office or to lack of interest on the part of the local profession. In a number of localities the fine work of individual physicians and medical societies were successful, especially in Rochester, Willmar and Stillwater. Under the supervision of the Committee on Medical Economics several publications were distributed by the State Office to both debaters and physicians. One of them was a "Handbook" on the subject of the high school debate question and was distributed to all debate coaches and others interested in Minnesota. This Handbook had a circulation that went all over the United States. Accompanying this Handbook was a brief for the use of high school debaters. We also distributed a sample talk on the subject, with an outline for the use of physicians for school and lay groups of all kinds.

Interprofessional Relationship.—The interests of all professions having to do with health are essentially identical and working together is a necessity. Representatives of these various professions have met together under the Committee's auspices and discussed

joint problems. This contact should be strengthened and continued.

Medical Economics.—The state office has continued to work with Dr. Braasch's Committee, this year, by assistance in preparation of copy for the Medical Economics section of MINNESOTA MEDICINE and assistance in collection of information for the Committee.

Comments on this work from medical officials and editors outside of Minnesota has been most favorable.

College Lecture Course.—Four or five lectures, making up a course on medical subjects for colleges are now an established part of our annual program. These lectures bring authentic information to college students and future teachers of the state and also promote invaluable good will.

News Service.—The weekly News Service issued by the Committee on Public Health Education, designed for use in weekly newspapers is prepared in the state office, approved by the Editorial subcommittee and distributed through the Minnesota Editorial Association. Nearly all of the 500 papers of the state use the service, regularly or at intervals.

County Officers' Meeting.—As far as possible, representatives of all the agencies, commissions and bureaus, whose functions involve physicians and medical care were invited to be present at the annual County Officers' Meeting.

Council.—The Council has met six times in the past year including meetings held in connection with the Annual Meeting last year. The problem of reorganization of medical relief is probably the most important that has faced the profession this year and the Council has taken definite action to provide a basis for negotiations with county officials. The following resolution was passed: "The free choice of physician by the patient should be established and maintained in every plan for care of the sick poor, no matter what other accompanying arrangements may be made. The free choice of physician by the patient is regarded by the Council of the Minnesota State Medical Association as the fundamental principle which should underlie and guide all forms of medical practice in the United States."

The Council went on record as approving the Red Cross plan for First Aid Stations on the highways, provided that county medical societies control all medical phases and the chairman of each local advisory committee is a physician.

A Medico-Legal Advisory Committee was appointed for the purpose of advising with members who are threatened with malpractice litigation and also for the purpose of keeping the membership informed on the malpractice situation in general.

Members of the Council as an advisory committee to Dr. Chesley on the administration of Social Security funds, will keep in close touch with all developments and advise and assist the membership in assuming responsible leadership in each locality.

The Johnson Memorial Fund which has already reached more than \$600 in cash and considerably more in pledges and which will be used for a lectureship on the social and economic aspects of medicine at the University of Minnesota, and the granting of a charter to the Dakota County Medical Society, were also reported on.

* * *

In addition to his report, Secretary Meyerding stated that the registration of doctors had already reached 407. It was moved by Dr. K. A. Danielson, seconded and carried, that the report of the Secretary, including the report of the Chairman of the Council, be approved and that all the acts, contacts and appointments made by the Council, the Secretary and the Treasurer for the past year be adopted.

Comparison of Paid Membership Minnesota State

Medical Association, April 28, 1935, and

April 28, 1936

Medical Society	Membership Dec. 31, 1935 Total	Paid Apr. 28, 1935	Paid Apr. 28, 1936
Blue Earth County.....	33	30	29
Blue Earth Valley.....	30	30	32
Camp Release District.....	22	21	19
Clay-Becker County.....	20	20	19
Dakota County.....	7	..	2
East Central Minnesota.....	38	36	34
Freeborn County.....	20	19	23
Goodhue County.....	19	19	20
Hennepin County.....	537	497	516
Kandivohi-Swift-Meeker.....	31	30	31
Lyon-Lincoln County.....	21	21	18
Mower County.....	23	23	24
McLeod County.....	16	16	17
Nicollet-Le Sueur County.....	17	17	15
Olmsted-Houston-Fillmore Dodge County.....	308	285	286
Park Region District and County.....	52	46	52
Ramsey County.....	303	302	306
Red River Valley.....	55	49	50
Redwood-Brown County.....	25	24	25
Renville County.....	20	20	20
Rice County.....	35	35	38
St. Louis County.....	176	154	171
Scott-Carver County.....	27	27	26
Southwestern Minnesota.....	53	51	55
Stearns-Benton County.....	36	36	32
Steele County.....	18	18	17
Upper Mississippi.....	84	78	81
Wabasha County.....	9	9	9
Waseca County.....	10	9	9
Washington County.....	16	16	15
Watsonwan County.....	8	8	7
West Central Minnesota.....	24	24	24
Winona County.....	24	24	25
Wright County.....	21	21	19
	2,138	2,015	2,066

Dr. H. E. Hilleboe, Director of the Tuberculosis Division of the State Board of Control, appeared before the House of Delegates and outlined the program for expenditures of Social Security Funds for crippled children.

COMMITTEE ON PUBLIC HEALTH EDUCATION

Dr. L. R. Critchfield, chairman, presented the report of the Committee on Public Health Education, pointing out that the problem of the committee has become twofold: the extension of public knowledge of medical procedures and public confidence in the medical profession; urging upon the profession the necessity for keeping abreast of all the new immunization and diagnostic procedures. With the passage of the Social Security Act, a new focus is placed on the question of immunization and the physicians must be ready to cooperate in every way.

Several educational services are maintained continuously by this Committee to assist the physician in the work of educating the public about matters of health and prevention of disease, also to assist the public in distinguishing quackery from authoritative medicine. These include the College Lecture Course, weekly newspaper service reaching nearly 500 state papers, health talks numbering 688 during 1935-36, Speakers' Bureau to give these talks, Speakers' Library, *Everybody's Health* magazine, carrying authentic information on health and disease prevention and preaching the "family doctor" as a fundamental principle of good health protection, 4-H Club Health Examination to choose a state health champion, distribution of health diaries, first aid manuals and "Handbooks of Health."

The Committee also cooperates in every way possible with the Women's Auxiliary.

The Reference Committee suggested that the delegates make a special point of presenting the contents of this report before their local societies.

COMMITTEE ON STATE HEALTH RELATIONS

In submitting the report on the Committee on State Health Relations, Dr. T. H. Sweetser, chairman, stated the committee occupied itself principally with two problems during the year:

1. *Care of the indigent.* The experience of the SERA has demonstrated that medical care of the individual can be carried on by all the doctors of each community on a fee basis with preservation of choice of physician for the patient. The Committee worked to further this system. Appreciation was expressed for the work done by the Secretary and his staff, Mr. Rosell and the Council Committee under Dr. Giffin. Dr. Locken's talk before the Convention of County Commissioners was commended.

2. *Survey of medical care in State Institutions under the State Board of Control.* The Committee has practically completed its visits and individual reports.

The report was discussed at some length. It was moved by Dr. C. L. Farabaugh, seconded and carried, that the House of Delegates commend the action of Dr. Paul C. Leck of Austin, in resigning as county physician, and that it offer its support to the effort to eliminate the old fashioned county doctor in relation to all county practice.

Dr. B. S. Adams moved and it was seconded and carried that a copy of the address made before the County Commissioners by Dr. O. E. Locken be sent by the Secretary to every member of the Association.

REPORT OF COUNCILORS

That affairs were progressing satisfactorily in their districts were reported by the following Councilors:

H. Z. Giffin.....	First District
L. L. Sogge.....	Second District
H. M. Workman.....	Third District
J. S. Holbrook.....	Fourth District
G. A. Earl.....	Fifth District
J. M. Hayes.....	Sixth District
E. J. Simons.....	Seventh District
W. L. Burnap.....	Eighth District
B. S. Adams.....	Ninth District

EDITING AND PUBLISHING COMMITTEE

Presenting the report of the Editing and Publishing Committee, Dr. J. T. Christison, chairman, stated: "In spite of the economic situation and the fact that MINNESOTA MEDICINE has increased materially in size, you will note that we are not in the 'red.'" A profit of \$615.22, the largest for some years, was shown for 1935.

RADIO COMMITTEE

Dr. R. M. Burns, chairman of the Radio Committee, reported forty-seven radio talks given over WCCO from May 1, 1935, to May 1, 1936, all by Dr. William A. O'Brien, Associate Professor of Pathology and Preventive Medicine, University of Minnesota. The service started in 1928, and to date 400 radio talks have been sponsored by the Association, with Dr. O'Brien, whose popularity is more firmly established each year, as weekly speaker.

The broadcast has been changed from Wednesday to Tuesday and the station finds it difficult to assure a regular time because of commercial programs. The Minnesota State Dental Association sponsored eight of these talks and was well pleased with the response. There has been an unusual demand for the speaker for personal appearances. From January 1, 1931, to

December, 1935, Dr. O'Brien gave 723 talks and had to decline many others. The program is still rated as one of the most popular and best known of all features from the station, and mail continues very heavy.

* * *

The Reference Committee moved that the Radio Committee be commended for its splendid work, and recommended that letters of appreciation be sent to Dr. O'Brien for his untiring efforts in these programs. The Reference Committee also recommended that a letter of appreciation be sent to Station WCCO for its generosity in making these broadcasts possible. The motion was seconded and carried.

COMMITTEE ON HOSPITALS AND MEDICAL EDUCATION

Dr. C. A. McKinlay, chairman, presented the report of the Committee on Hospitals and Medical Education. With regard to postgraduate instruction for physicians, medical short course lectures were held in Blue Earth, Hutchinson, Glencoe, Willmar and Olivia during the past year through the coöperation of the General Extension Division of the University of which Dr. R. R. Price is director.

At the University, the Minnesota Medical Alumni Association, coöperating with this Committee, sponsored homecoming lectures and clinics. Courses in refraction for four weeks were held in April and November. Courses were also offered one night weekly on practical preventive medicine, tuberculosis and other diseases of the chest, tuberculosis and its control. All were appreciated.

Future plans include the encouragement of wider use of postgraduate medical instruction. The coöperation of the medical school is offered through Dean H. S. Diehl.

COMMITTEE ON PUBLIC POLICY AND LEGISLATION

Report of the Committee on Public Policy and Legislation was presented by Dr. L. L. Sogge. A representative of the Committee was in constant attendance at the special session of the legislature and any objectionable bills were opposed. None was enacted into law. Dr. C. I. Oliver and Dr. J. L. McLeod are members of the Senate. Through their efforts, a provision was put in the Old Age Pension Act providing for medical, surgical, dental, hospital and nursing care in addition to the pension paid.

The Committee has also been assured that it will have an opportunity to be heard when rules are formulated for a new set-up in connection with the administering of state relief.

* * *

It was moved by Dr. F. H. Magney, seconded and carried, that the House of Delegates write Drs. Oliver and McLeod expressing its appreciation for the services they have rendered the Association.

COMMITTEE ON PUBLIC HEALTH NURSING

Dr. E. S. Boleyn, chairman of the Committee on Public Health Nursing, presented the following report: "The principal matter which has come up is the new Policies and Standing Orders for Public Health Nursing Services. The present Orders were considered insufficient and out of date and the Committee felt that certain items should be referred to specialists. This was done, and the revised Orders referred to the Council. The Council accepted same, barring one

item, the treatment of burns. For this, tannic acid was recommended as the only treatment."

* * *

The Reference Committee moved that this report be accepted with the suggestion that the last sentence be changed to read: "The Council accepted the same, barring one item, the first-aid treatment of burns," instead of the treatment of burns. The Chairman of the Committee agreed to this change and the report was adopted.

COMMITTEE ON INDUSTRIAL RELATIONS

Dr. J. M. Hayes, chairman of the Committee on Industrial Relations, reported that, though the state committee has had no meeting, the Hennepin County Medical Society was trying to institute a plan which it hoped would be adopted by the State Association. Some of the adjusters of companies carrying the greatest amount of compensation insurance suggested that the County Society present a panel of doctors to them to replace the limited panel which they had formerly chosen themselves.

* * *

The matter was discussed and the Reference Committee moved that no action be taken on the report at that time other than to disseminate the proposal and facts involved to the profession, with the means of dissemination left to the discretion of the Council.

COMMITTEE ON MILITARY AFFAIRS

Lt. Col. F. L. Smith, chairman of the Committee on Military Affairs, reported that with the curtailment of CCC Camps from 104 to 69, there was a reduction in the employment of medical reserve officers.

Reserve officers and civilian members of the profession are urged by the Committee to seek support of legislators and regents in bringing about compulsory R. O. T. C. training.

The Seventh Annual Medical Reserve Officers Inactive Duty Training Unit was held under the auspices of the Mayo Foundation at Rochester this year, with the largest attendance in its history. The committee sponsored an exhibit at the annual meeting.

COMMITTEE ON CANCER

Dr. Martin Nordland, chairman of the Committee on Cancer, reported that for two years it has been the aim of the Committee to arouse interest of the profession in cancer. This subject has received its share of attention at each state meeting and county societies have been urged to devote one meeting a year to cancer.

Members of the Committee met February 5, with Dr. F. L. Rector, field representative of the American Society for the Control of Cancer, and Mrs. Illig, chairman of the Public Health Committee of the Minnesota Federation of Women's Clubs. Dr. Rector and Mrs. Illig outlined a program for presenting the subject to the laity through the medium of federated clubs. The committee agreed to coöperate in the effort.

COMMITTEE ON INTERPROFESSIONAL RELATIONSHIP

Dr. F. J. Savage, chairman, submitted the report of the Committee on Interprofessional Relationship. Following conferences with pharmacists, they recommended the following:

- "1. That conferences and coöperation between the pharmacists and the Medical Association be continued.
- "2. That County Medical Societies give the pharmacists opportunity for conference and discussion.
- "3. That MINNESOTA MEDICINE give them reasonable space

or presenting certain of their problems, and that this recommendation be brought to the attention of the Editing and Publishing Committee and to the Pharmacists' Association by our secretary.

"4. That our secretary call the attention of the Dean of Medical Sciences to our opinion that the teaching of therapeutics and prescription writing is inadequate, and urge him that it be made adequate and worthy of the reputation and standing of our medical school.

"5. That the Council of the State Medical Association consider the advisability of recommending legislative action making the dispensing of barbiturates permissible only on prescription."

The Committee also met with nurses and representatives of the Minnesota Hospital Association. Nursing education standards were discussed and it was agreed that extensive training is necessary for those nurses who intend to teach or go into administrative work, but that a Ph.D. degree is not needed for ordinary bedside nursing and that if requirements for such nursing are steadily raised, the cost will become too high for the patient to pay. It was pointed out that there has been a definite shortage of nurses in some places during the past winter.

Dr. C. B. Wright presented six criticisms which, he said, are often brought up and should be discussed. They were: arbitrary ruling on hours and cost of nursing are made without notifying hospitals or doctors; arbitrary rulings are made as to the number of nurses that can be educated in a given hospital and the number of patients that each hospital shall have to care for in order to retain a nurses' training school; arbitrary rulings are made on the physical equipment and sanitary standards in a hospital where nurses are to be approved for registration; attempts are being made to raise the standard for education above the need for bedside nursing which would mean a scarcity of nurses and hardships for the public; attempts to pass laws which would put the control of nursing education in the hands of lay people; suggestions that a thorough study be made of the law under which the Board of Nursing Examiners is operating to determine its limitations and to bring about such modifications as will make the law cover present-day requirements.

These are to be discussed at a coming meeting. The Committee believes that similar future meetings are well worth while.

* * *

The Reference Committee commended this important and instructive report and moved the adoption of the recommendations contained therein, the method of carrying out these recommendations to be left to the Council. The motion was seconded and carried.

COMMITTEE ON DIABETES

The report of the Committee on Diabetes, presented by Dr. R. M. Wilder, chairman, quoted figures from the "Statistical Bulletin of the Metropolitan Life Insurance Company," showing that since the beginning of the century, diabetes has risen from a comparatively minor cause of death in the United States to ninth place, while tuberculosis has fallen from first to seventh. The death rate from diabetes among white females, in fourteen states during 1933 and 1934, exceeded that from tuberculosis.

"The implication of these figures and others quoted is obvious," the report states. Diabetes and other chronic diseases are certain to demand more and more attention from public health officials, as the average age of our population increases and the incidence of acute diseases and of tuberculosis decreases. The organizations which have been built up to combat tuberculosis may well extend their work to the study and control of other chronic diseases. This idea has already taken hold in several parts of the country and should be encouraged everywhere.

COMMITTEE ON DEAFNESS PREVENTION AND AMELIORATION

The report of the Committee on Deafness Prevention and Amelioration submitted by Dr. Horace Newhart, chairman, brought out that the committee has made progress during the past year. A notable growth in interest in group testing of the hearing acuity of children has been shown. Under the direction of the committee testing in rural schools was inaugurated in Blue Earth, Goodhue, and Washington counties. Demonstration surveys and public health meetings, emphasizing the conservation of hearing were conducted in several communities. There is a noticeable awakening of public interest in the movement for better hearing. The Committee acknowledges the coöperation of the Minnesota Public Health Association, the State Department of Education and the State School for the Deaf.

COMMITTEE ON MEDICAL ECONOMICS

Dr. W. F. Braasch, chairman of the Committee on Medical Economics, said that, during the past year, the committee has continued to collaborate with the State Office in preparing material for the Medical Economics Section in MINNESOTA MEDICINE, where an effort is made to arouse interest in economic subjects and to keep members informed on social and economic problems of the day.

At a committee meeting recently held, several problems of interest were discussed including the following:

Statistics were quoted showing that in a few hospitals in the Twin Cities, during the year 1934, almost 500,000 treatments were given without cost. Many of the patients, undoubtedly, were not indigents. A survey on this subject was made by the Chicago Medical Society showing that approximately 13 per cent of patients treated received free medical care although they could afford to pay for it. In some instances this ran as high as 25 per cent; in others as low as 5 or 6 per cent.

Various problems concerning the Student Health Service at the University of Minnesota were discussed at length and much credit was given the administrative ability of Dr. Diehl. However, the Committee believes that closer coöperation between the Health Service and home doctor should be established so that the Health Service could be informed on previous examinations by home doctors and clinical data on the student could be transmitted to the home doctor when the student returns home.

It was also suggested that cost of services, such as roentgenograms and laboratory examinations, be omitted from Health Service blanks.

It was further suggested that more than one physician should be required to sign admission blanks to the University hospital thereby eliminating personal reasons other than pecuniary for sending patients to the University Hospital.

Other matters such as the provisions of the Social Security Act relating to maternal and child welfare, the determination of fees for accident and industrial cases by lay boards, and the Red Cross first-aid program were discussed, but on these matters steps had already been taken on behalf of the medical profession.

Attention was called to the establishment of a camp for the treatment of venereal diseases in Northern Minnesota, under the supervision of a physician in the employ of the government. The need of such an institution for transient workers was questioned and the matter referred to members living in that locality.

MEDICO-LEGAL ADVISORY COMMITTEE

Dr. B. J. Branton, chairman, presented the report of the Medico-Legal Advisory Committee, which was appointed by the Council following a motion calling for such a committee at the House of Delegates meeting last year. The new committee has carried on an educational campaign by talks, magazine articles and personal contacts. It has held frequent meetings with representatives of insurance carriers, looking toward the lessening of malpractice cases and reduction in premiums.

COMMITTEE TO STUDY CONTRACT PRACTICE

The Committee to Study Contract Practice, the report of which was given by Dr. O. W. Yoerg, chairman, offered two suggestions:

1. That the State Association endorse and accept the Standards relating to Contract Practice as simplified and revised by the Judicial Council of the American Medical Association in 1934, since the Committee feels that this is concise yet broad enough to cover sound principles.

2. That each County Society accept and use as a standard the Declaration. It is further suggested that the members of the Association be furnished a copy with the endorsement of the Council.

* * *

The Reference Committee recommended the adoption of the two suggestions and further suggests an interpretation of No. 5 in the Standards, which reads "When free choice of physician is prevented," about which there seems to be some misunderstanding. This was regularly seconded and carried.

COMMITTEE ON MATERNAL WELFARE

The program adopted by the Committee on Maternal Welfare, according to the report of Dr. R. D. Mussey, chairman, is being developed along three lines.

1. To cooperate with various state and private agencies.

2. To assist in education of the laity relative to the value of prenatal care.

3. To recommend the presentation of papers on obstetrical subjects before various medical meetings in the state. A Minnesota Society of Obstetrics and Gynecology is being organized.

The State Medical Association has four representatives on the State Advisory Committee on Maternal and Child Welfare who will join with this committee and the State Board of Health in carrying out the program under the Social Security Act.

Other committees which presented no special reports for the year since there had been no outstanding activity, include:

Committee on University Relations
Committee on Medico-Legal Affairs
Heart Committee
Editorial Association Committee

RESOLUTIONS

Secretary Meyerding presented a number of resolutions. The first one recommended that the State Board of Health be continued as an independent department of state government and commended the department

for its fine program and close cooperation with the medical profession in Minnesota.

A second resolution expressed the appreciation of the association to Mr. L. P. Zimmerman, State Relief Administrator, for his work for the medical care of the indigent and the efforts of his staff to guide county organizations toward the continuance of SERA policies in medical care for the indigent.

A resolution also expressed the association's gratitude for Mr. Victor A. Christgau's fine work and the manner in which he and his associates have recognized the local practicing physician.

A fourth resolution urged county commissioners and welfare boards to assume the responsibility of medical care for the aged who are receiving old age pensions, and make special provision to care for needy old people.

Secretary Meyerding also read three considerations regarded as fundamental to good medical care in Minnesota and recommended for inclusion in the new relief and welfare legislation now being drawn up for enactment by the state legislature. (These considerations are printed in full in the Council report above.)

The Reference Committee reported it had considered these resolutions separately, but if not out of order, would move that all be adopted by one ballot. Dr. B. S. Adams asked that there be included in that motion that a copy be sent to the respective recipients. This was agreed to and the motion was seconded and carried.

Secretary Meyerding read a resolution submitted by the Interprofessional Relationship Committee and approved by the Executive Committee of the Hennepin County Medical Society and later referred to the State Association. This resolution, which was presented by Dr. Hayes was as follows:

"The Interprofessional Relationship Committee believes that it is advisable for the various professions, viz., physicians, dentists, nurses and pharmacists, to get behind a movement which will lead to the enactment of proper legislation at the next session of the legislature to sponsor a law making it illegal to sell or give away barbituric acid and its derivatives without a doctor's prescription."

* * *

The Reference Committee approved the resolution and moved its adoption, seconded and carried.

REVISED CONSTITUTION

The Reference Committee, in its report on the Revised Constitution, called attention to the reason for the major changes made in the old constitution. First, the wording in the present Constitution is ambiguous and misleading in many instances. It also gives the impression that this organization is designed for the protection and profit of its members. The wording in the revised version tends to emphasize the scientific advancement of the organization.

Second, changes have been made to clarify the method of election, the duties and responsibilities of the officers and eligibility for office.

A new feature has been added, the office of Speaker

of the House of Delegates, to be elected yearly by the House. This change conforms to the newer constitutions now being adopted elsewhere and is modeled after the American Medical Association. It will facilitate the business of the House.

The By-Laws were not presented for consideration as the Committee felt they had not had sufficient time to complete the clarification of this section and requested that this be laid over until the next annual meeting.

* * *

The Reference Committee recommended that the Constitution be revised as presented and that it be published in MINNESOTA MEDICINE as prescribed in the present Constitution. It further recommended that a careful study be given the revisions by members of the Association and that any suggestions, criticisms or amendments be sent to the State Office so that they may be considered by the committee, and that with these revisions it be presented at the next annual meeting for adoption.

The Reference Committee further recommended that the suggestion of the Constitution Committee regarding the By-Laws be accepted and that these be studied further and presented with the Constitution for adoption next year.

Feeling that the Committee on Constitution had done a constructive piece of work, the Reference Committee recommended that its activities be continued.

The recommendations were seconded and carried.

AMENDMENT

The following amendment to Article IV, Section 4, of the Constitution was brought before the Delegates for the second time and adopted:

"Affiliate members shall be those members of the component medical societies who (1) through disability are unable to engage in the practice of medicine, (2) have retired from the practice of medicine, providing however, that such member in either class shall have first, at his own request, been declared an affiliate member of such component society at its regular meeting, such action having been approved by the Council and providing further that such affiliate membership shall automatically cease and revert to its previous status on the termination of disability or on the resumption of practice. Nothing in this section shall in any manner invalidate an affiliate membership in good standing at the time of the adoption of this amendment."

A resolution adopted by the Executive Committee of the Hennepin County Medical Society was presented by Dr. C. A. Stewart. The committee voted to recommend some method whereby the responsibility of application of admission of a patient to the University Hospital and Dispensary is not left exclusively to the local physician and that this resolution be referred to the Council of the state association and the University Relations Committee of the association to formulate plans, possibly along the line used in Iowa, where three or more persons sign the patient's application. It was also recommended that the University Relations Committee be authorized to act when satisfactory plans have been devised. This was referred to the Council.

The House of Delegates then adjourned until Tuesday, May 5.

HOUSE OF DELEGATES

Second Meeting

Tuesday, May 5, 1936

The second meeting of the House of Delegates convened at 12 o'clock, Tuesday, May 5.

The following officers were nominated and elected:

President.....A. W. Adson, Rochester
First Vice President.....H. W. Goehrs, St. Cloud
Second Vice President.....D. P. Head, Minneapolis
Secretary.....E. A. Meyerding, St. Paul
Treasurer.....W. H. Condit, Minneapolis
Councilors:
Fourth District.....J. S. Holbrook, Mankato
Sixth District.....J. M. Hayes, Minneapolis
Eighth District.....W. L. Burnap, Fergus Falls

Secretary Meyerding read the report of the Historical Committee and the Necrology Report, which were adopted.

NECROLOGY REPORT

In Memoriam

MEMBERS OF THE MINNESOTA STATE MEDICAL ASSOCIATION

June 20, 1935 - May 3, 1936

Rollin Theodore Adams, Mantorville. Born 1864. University of Minnesota, 1893. Died Dec. 6, 1935. Aged 71.

Allen Tindolph Agnew, International Falls. Born 1891. University of Minnesota, 1917. Died Sept. 28, 1935. Aged 44.

Clifford E. Alexander, Duluth. Born 1901. University of Minnesota, 1925. Died Feb. 9, 1936. Aged 34.

Frank M. Archibald, Mahanomen. Born 1865. University of Illinois, 1893. Died March 1, 1936. Aged 70.

George Elgie Brown, Rochester. Born 1885. University of Michigan, 1909. Died Nov. 28, 1935. Aged 50.

Frank Wright Bullen, Hibbing. Born 1869. Rush Medical College, 1896. Died July 21, 1935. Aged 66.

George Radcliffe Duncan, Oak Terrace. Born 1903. University of Minnesota, 1929. Died April 6, 1936. Aged 33.

Frank Llewellyn Durgin, Winnebago. Born 1851. Western Reserve University, 1882. Died Sept. 23, 1935. Aged 83.

Chester E. Gates, Anoka. Born 1879. University of Minnesota, 1904. Died June 24, 1935. Aged 56.

Verner Paul Johnson, Delano. Born 1902. University of Minnesota, 1926. Died March 18, 1936. Aged 34.

Edward Starr Judd, Rochester. Born 1878. University of Minnesota, 1902. Died November 29, 1935. Aged 57.

William Nassau Kendrick, Spring Valley. Born 1872. McGill University, 1896. Died Jan. 21, 1936. Aged 63.

William W. Lewis, St. Paul. Born 1873. University of Minnesota, 1902. Died July 29, 1935. Aged 62.

Clarence Edward Lum, Nisswa. Born 1862. Minnesota Hospital College, 1885. Died Sept. 7, 1935. Aged 73.

Charles Naumann McCloud, St. Paul. Born 1872. University of Minnesota, 1901. Died August 13, 1935. Aged 63.

Roderick Frederick McHugh, Aitken. Born 1889. Milwaukee Medical College, 1912. Died July 31, 1935. Aged 46.

Charles Gustaf Nordin, St. Paul. Born 1885. University of Minnesota, 1910. Died Oct. 9, 1935. Aged 50.

Justus Ohage, St. Paul. Born 1849. University of Missouri, 1880. Died Dec. 26, 1935. Aged 86.

John M. Rains, Willmar. Born 1850. Victoria University, 1870. Died Nov. 10, 1935. Aged 85.

Emory Chester Rebman, Austin. Born 1885. Northwestern University, 1909. Died Jan. 7, 1936. Aged 50.

Walter Jay Richardson, Fairmont. Born 1856. College of Physicians & Surgeons, N. Y., 1885. Died Feb. 20, 1936. Aged 79.

David Edward Seashore, Duluth. Born 1875. University of Minnesota, 1902. Died Nov. 4, 1935. Aged 60.

Edwin H. Smith, Bemidji. Born 1876. University of Minnesota, 1900. Died July 7, 1935. Aged 59.

Patrick Albert Smith, Faribault. Born 1866. Jefferson Medical College, 1893. Died Nov. 27, 1935. Aged 69.

Lawrence F. V. Sutton, Mazeppa. Born 1878. College of Physicians & Surgeons, Baltimore, 1906. Died Dec. 4, 1935. Aged 56.

Frederick W. Van Valkenburg, Long Prairie. Born 1898. University of Minnesota, 1925. Died Feb. 8, 1936. Aged 38.

Neill Malcolm Watson, Red Lake Falls. Born 1865. McGill University, 1891. Died March, 1936. Aged 71.

FORMER MEMBERS

Arthur T. Caine, Anoka. Born 1875. University of Minnesota, 1900. Died Sept. 12, 1935. Aged 60.

George Everett Clark, Stillwater. Born 1852. Hahnemann Medical College, Chicago, 1880. Died August 26, 1935. Aged 83.

John B. Dunn, St. Cloud. Born 1859. Rush Medical College, 1882. Died Feb. 7, 1936. Aged 76.

William Sommerville Fullerton, St. Paul. Born 1857. Bellevue Medical College, 1881. Died Feb. 7, 1936. Aged 79.

Jacob Wells Meighen, Ulen. Born 1864. University of Minnesota, 1896. Died Dec. 9, 1935. Aged 72.

O. A. Oredson, Duluth. Born 1872. Minneapolis College of Physicians & Surgeons, 1903. Died Nov. 25, 1935. Aged 63.

Dr. J. S. Reynolds moved that the association accept the invitation of the Ramsey County Medical Society to entertain the association in St. Paul, in 1937. This was seconded and carried.

Dr. F. E. Burch read the following resolution on behalf of the committee from the Minnesota Academy of Ophthalmology and Otolaryngology:

"Your committee recommends the following as defining blindness in its application to the 'Social Security Act.'

"Blindness shall be defined as loss of sight if vision is 20/200 or less in the better eye with standard Snellen chart and cannot be remedied or improved;

"Or, if with correction the individual is unable to read Snellen 1.50;

"Or, if vision in the better eye is accompanied by a contracted field of vision to within 20 degrees of the fixation point in all quadrants, as determined by standard perimeter tests."

On motion of Dr. Earl, seconded and carried, this resolution was adopted.

The following recommendation of the Committee on Public Health Education was read by Dr. L. R. Critchfield, chairman, and was adopted:

"At the meeting of the Committee on Public Health Education today, a motion was made that the State Association go on record as favoring calling the attention of broadcasting companies still using programs promoting laxatives, to the possible dangers attendant in the uncontrolled use of these remedies. Also, that letter of commendation be written to broadcasting companies which have already discontinued such programs."

Dr. Adson, president-elect, was presented and made a few remarks.

Dr. Savage and Dr. Hayes were appointed to draw up resolutions of thanks to the following: Olmsted-Houston-Fillmore-Dodge County Medical Society, Kahler Hotel, St. Mary's Hospital, and the Mayo Clinic.

The meeting adjourned.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

PROCTOLOGY. A Treatise on the Malformation, Injuries and Diseases of the Rectum, Anus and Pelvic Colon. Frank C. Yeomans, A.B., M.D., F.A.C.S., M.R.S.M. (London, Hon.), Prof. of Proctology, New York Polyclinic Medical School, Fellow and Past President American Proctologic Society, etc. 661 pages. Illus. Cloth binding. New York: D. Appleton-Century Co. 1936.

FUNDAMENTALS OF HUMAN PHYSIOLOGY. J. J. R. Macleod, M.B., D.Sc., F.R.S. Late Regius Professor of Physiology in University of Aberdeen, Scotland; Formerly Professor of Physiology in University of Toronto, Canada, etc. 424 pages. Illus. Price, cloth, \$2.50. St. Louis: C. V. Mosby Co., 1936.

SYNOPSIS OF CLINICAL LABORATORY METHODS. W. E. Bray, B.A., M.D., Professor of Clinical Pathology and Director of Clinical Laboratories, University of Virginia Hospitals. 324 pages. Illus. Price \$3.75. St. Louis: C. V. Mosby Company, 1936.

A very excellent, brief compilation of clinical laboratory procedures. Apparently nothing of importance has been omitted. Methods, although brief, are clear and can be followed by anyone with sufficient experience to do laboratory work.

A chapter listing stains and laboratory reagents is very convenient.

Tables of normals is another unusual and noteworthy feature.

I can recommend the book most highly.

FLOYD GRAVE, M.D.

FOR AND AGAINST DOCTORS. Compiled by Robert Hutchison and G. M. Wauchope. 168 pages. \$2.00. Baltimore: Wm. Wood & Co., 1935.

Most doctors feel that, of all the extravagant praise and blame which is applied so freely to them by the rest of the world, only a little is deserved. That doctors are the subject of continuous comment, all of us must recognize, and in fact some of our best bridge table conversation, and even wit, concerns doctors. Recognizing this and perhaps enjoying a little finding out what others say about us, Hutchison and Wauchope, doctors, English of course, have compiled the brighter of the sayings from the literature of the world. The name of the book describes its contents, "For and Against Doctors." On the whole the statements "against" are much the more amusing. Those "for" are sometimes even a little embarrassing. Such a book as this is worth having to pick up for a moment, and for the younger doctor may be a means of preventing either the pride that goes with a little success, or the discomfort which comes from unmerited criticism. Epigrams and proverbs, essays and plays, and even poetry are freely represented here. The ancient proverbs and epigrams are most interesting; they need only to be restated to make them modern, although the age of the laboratory, the robot physician and the nickel-in-the-slot doctor, is beginning to give our lay commentators new material.

H. B. SWEETSER, JR., M.D.

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HEPATIC PHYSIOLOGY AND PATHOLOGY FROM THE SURGICAL VIEWPOINT*

A Review of Experimental Investigations

FRANK C. MANN, M.D.

Rochester, Minnesota

IT IS with much apprehension that I attempt to present this third Judd Lecture. When Doctor Judd, in his quiet way, invited me to give this lecture, I misunderstood him and, under the impression that he desired me to fulfill a lecture appointment here at the University which he was unable to fulfill himself, I readily assented. Not until I received a letter from Doctor Wangenstein, to whom I also owe much for this honor, did I realize that I had been invited to give the Judd Lecture. I then discussed the question with Doctor Judd in regard to the advisability of an experimental investigator, who must by necessity present a subject of possibly only academic interest and at best of doubtful clinical importance, giving the lecture which, on the two previous occasions of its presentation, had been of such predominant clinical interest and surgical importance. Doctor Judd assured me that he and Doctor Wangenstein had agreed that the lectureship should sponsor experimental as well as clinical research in subjects of surgical significance and that he personally would like to have some of the results of the investigations which my associates and I had been doing in regard to the liver presented as a Judd Lecture.

Owing to Doctor Judd's preëminence in clinical surgery it has probably never been realized that he also took a keen interest in experimental surgery and research. The second day after I was given the opportunity of having the direction of the new surgical research laboratory at The Mayo Clinic, Doctor Judd came to see me.

This was the second time I had met him. At this time he emphasized the importance of learning more about the physiology and pathology of the biliary tract and stated his belief that experimental research would be necessary to solve some of the problems confronting the surgeon in regard to this important structure. How well the history of the recent advances in knowledge of the biliary tract has borne out his belief! He suggested that we begin by observing the effect of removal of the gallbladder on the remaining portion of the extrahepatic biliary tract. From that time until the present, each year, some problem on the biliary tract has been investigated by my associates or myself. Doctor Judd always took a keen personal interest in the problem under investigation and with the spirit of the true scientific investigator accepted the results of the research, regardless of how they might affect his preconceived ideas on the problem.

For many years Doctor Judd, accompanied by his surgical assistants, visited the Institute of Experimental Medicine each Thursday forenoon. Only his enforced absence from Rochester would prevent his making this weekly visit. Those of us working in the laboratories at the Institute made the practice of planning our work so that we could demonstrate the various phases of our researches to our visiting colleague. These demonstrations were presented in the form of an informal clinic with much free discussion. Doctor Judd brought to these conferences a clinical viewpoint which was exceedingly valuable and stimulating to those of us doing experimental research. His primary interest in his visit to the

*From the Division of Experimental Medicine, The Mayo Foundation, Rochester, Minnesota. Third Judd Lecture presented March 17, 1936, before the faculty and students of the Medical School, University of Minnesota.

Institute, as would be anticipated, was in experimental surgery. He would first visit the operating room where the various operations performed as a necessary prerequisite for our researches were being done. After completion of the operative work we would go to one of the other laboratories where the results of some of the various investigations in progress would be presented and discussed. While he was interested in everything we were doing, he evidenced the greatest interest in our researches on the functions and pathologic reactions of the liver. In his consideration of the results of these investigations on the liver Doctor Judd attempted to find correlations with, and applications to, his clinical problems. When, as usually happened, a direct application of the experimental findings to his clinical problem could not be obtained, he reviewed his clinical data more carefully to determine if a combined approach by the clinical and by the experimental investigator could be discovered.

It seemed to me that I could accomplish best what Doctor Judd had in mind when he and Doctor Wangenstein honored me with the invitation to present this lecture, by reviewing the problems concerning the liver which we discussed for so many years at our informal conferences. Since Doctor Judd's interests were so intensely surgical in nature, the phases of hepatic functions and reactions discussed were mainly those which perchance might have a surgical import. Accordingly I will attempt to maintain this viewpoint. The subject matter I wish to present is not new, but consists mainly of a review of the results of various investigations by my associates and myself.

In the first Judd Lecture the pituitary was presented as the master gland of the body, emphasizing that it apparently initiates and controls many of the important functions of the organism. I should like to leave with you the exactly opposite characterization of the activity of the liver. The liver is the servant of the body. From the time in fetal life when it first has imposed on it a blood supply over which it has little or no control until its activity ceases with that of the body, it is the physiologic drudge, constantly responding, often at the expense of its own cellular constituents, to the demands and needs of the rest of the organism.

The Importance of the Liver to Surgery

If I were faithfully to present a summary of the numerous discussions between Doctor Judd and those of us investigating the liver, it would consist mainly of questions and problems which at present are unanswerable. However, such a summary would emphasize not only the present inadequacy of knowledge concerning the organ, but also the potential significance of hepatic functions and reactions to surgery. The liver is of great surgical significance because of its important and manifold physiologic activities. Since the liver is either directly or indirectly involved in so many physiologic processes, it is obvious that many of the sustaining efforts of the organism when diseased, and the physiologic compensations made necessary by operation, involve the liver. From the time the patient enters the operating room until he is dismissed from the hospital, the hidden and often unappreciated activities of the liver are probably just as important in maintaining the life of the organism and in making for a successful outcome of the operation as are the functions of other organs, such as the heart, kidneys, and so forth which are observed so carefully by the surgeon. Probably the reason why the surgeon does not consider the liver in the same manner is not only because knowledge of its functions is as yet so scant and methods of observing them inadequate but also because the organ apparently does its work so well even under very adverse conditions.

The Physiologic Anatomy of the Liver

The liver, like other organs of the body, has certain anatomic features which are obviously of physiologic import. While its well known anatomic position, gross appearance, and relationship to other organs are worthy of serious consideration, they are not pertinent to the present subject. It should be noted, however, that in many species of animals the lobes of the liver are separated sufficiently to permit their successful removal surgically. This anatomic fact admits of investigation of the effects of partial removal of the organ. While in the human being the division into lobes is incomplete, the organ can almost be considered as bilateral as it is separated almost completely into two portions on the basis of vascular and duct radicals.

Its large size appears indicative of not only its manifold physiologic activities, but also of its capacity as a storehouse. Since hepatic tissue is exceeded in amount by only one other homogeneous tissue in the body, the voluntary muscle, hepatic activity must always be considered as a possibility in the maintenance of those mechanisms of the body which depend at least to a considerable extent on mass of tissue, such mechanisms as those concerned in maintenance of the reaction and amount of circulating fluid, production of energy for heat, storage of elaborated substances, and so forth.

The liver has a double blood supply. The blood reaching it through the hepatic artery is arterial in nature, is under the usual arterial pressure, and serves to supply the organ with oxygen in the same manner as the blood which passes to the other organs of the body. The arterial blood flow to the liver is under vasomotor control and is essential for the existence of the organ. The blood reaching the liver through the portal pathway, much larger in amount than the arterial blood, is venous in character, having already passed through one capillary bed, and has had added to it the many substances absorbed from the gastro-intestinal tract as well as those leaving the pancreas and spleen. The amount of blood flowing through the portal vein is under the control of the vasomotor mechanism of the first capillary bed it traverses and since stagnation of blood in the portal vein would be a serious condition, there is very little inhibiting control of the blood flowing through this pathway in the liver. The blood reaching the liver through the two vascular channels mixes before it arrives in the hepatic vein but the exact site at which this mixing occurs remains one of the unsolved anatomic-physiologic problems concerning the organ.

The liver receives nerves from both the sympathetic and parasympathetic systems, but the former are in greater abundance. Most of the nerves reach the liver by accompanying the hepatic artery and seem to be mainly for the purpose of controlling the blood flow through this artery. Section of the nerves to the liver has not produced a significant change in the functions of the organ so far studied. Evidence in regard to the distribution of the nerves in the liver is contradictory and it must be concluded

that a direct relationship between the nerve fibers and the hepatic cell has not been demonstrated.

The large supply of lymphatics leaving the liver denotes the importance of the organ in the formation of lymph. However, recent work would indicate that the liver is not as important in this respect as was formerly thought. It is questionable whether any special importance should be attached to the rôle of the liver in the formation of lymph and the process of lymph formation in this organ, as in other organs of the body, is probably only a necessary adjunct to its physiologic activities. The site and manner of origin of the lymphatics in the liver have not been definitely determined.

The liver possesses a simple histologic conformation which is amply suited for the interchange of many substances between the hepatic cell and the blood, as well as for the elaboration of an external secretion. Aggregates of hepatic cells forming small units have been described as portal lobules or as hepatic lobules, depending on whether primary consideration is given to the external or to the internal secretion of the liver. In view of the subordination of the bile-secreting function in relation to the numerous other hepatic functions associated with the transfer of substances between the blood and the liver, to consider these cellular aggregations to be hepatic lobules is preferable to considering them to be portal lobules.

The liver contains cells of three specific types: the hepatic cells, the stellate cells, and the cells of the biliary duct system. The last are typical duct cells and serve to surface the intrahepatic biliary ducts. The stellate or Kupffer cells partially line the sinusoids of the liver and are included in the reticulo-endothelial system because they remove the same type of foreign bodies from the blood stream as the cells of this system situated in other regions, such as the spleen and bone marrow. These cells have very important functions, but it has not been proved that the stellate cells function in a manner any different from that of the same type of cells in other tissue. The hepatic cell is the cellular constituent of the liver which is responsible for the majority of the functions of the organ. These are situated in the radiating trabeculae which make up the lobule. They are character-

istic in shape and variable in size. They are constantly changing, depending on their physiologic activity.

One of the most important structural characteristics of the liver is the arrangement of the supporting tissue of the organ. The liver is completely invested with a thin covering of connective tissue which extends throughout the organ, forming a more or less complete wall around the lobules and a supporting framework for the cords of hepatic cells. The arrangement of this supporting tissue is so definite, constant and characteristic in the normal organ that it presents an unvarying pattern to which changes attributable to pathologic processes in the organ can be compared. Changes in the hepatic pattern furnish one of the best criteria of pathologic processes that have occurred and studies of the changing pattern of the liver in hepatic disease have demonstrated some of the causes and limitations of hepatic reaction.

Hepatic Functions

A very important general physiologic characteristic of the liver is its great variability in activity. The nature of many of its functions would indicate that it has a dynamic, not a static character. There is often an extremely rapid change in the rate at which it maintains its various functions. Furthermore, a few of the physiologic processes in which the liver has an integral part are completed wholly by, or within, the organ. This fact, together with the variability in functional activity and capacity, has an important bearing in regard to quantitating hepatic function by tests.

The most important known functions of the liver have to do with metabolism. The liver appears to be essential for certain phases of the metabolism of each of the major foodstuffs. In general the function of the liver in relation to metabolism is to make constantly available in ample quantity readily utilizable food for the body, regardless of the rate at which food reaches the body or the rate at which it is metabolized.

The liver stores carbohydrates in the form of glycogen and manufactures glucose from other substances. It regulates the concentration of glucose in the blood, making possible a constant amount of fuel for the other tissues of the body, particularly the muscles. If this func-

tion of the liver fails, hypoglycemia, with its resulting fatal issue, occurs. Some procedures and substances stimulate the liver to give the blood an abnormal amount of glucose, and hyperglycemia results. The liver is probably always involved either directly or indirectly in hyperglycemia or hypoglycemia.

While the liver appears to be a storehouse for protein, its most important activities in relation to this foodstuff are the deamination of the amino-acids and the formation of urea. In the former process it manufactures glucose from protein and in the latter it makes the waste portion of the amino-acids into a substance readily excreted from the body. In addition, the liver changes uric acid to allantoin in those species of animals in which uric acid is not excreted unchanged in the urine.

The relation of the liver to metabolism of fat is unknown, but there appears to be no question that it does have a part, probably an essential one, in the metabolism of this foodstuff. At any event, the organ is a storehouse for fat, as is evidenced by the fact that on a diet of fat, the fat content of the liver may reach as high as 40 per cent of the total amount of hepatic tissue. The fat content of the liver is extremely variable, depending on many factors, some of which are known. The fat and glycogen in the liver bear a reciprocal relation to each other, and only under special conditions is the content of each high in the organ at the same time. The fat content of the liver increases in a few physiologic states and after the administration of substances which injure the organ. Recent work has indicated that choline is of importance in mobilizing the fat in the liver.

Hepatic activity is involved in the metabolism of some of the inorganic elements of the body, particularly minerals. Minerals are excreted in the bile and the hepatic tissue contains a varying amount of inorganic material. The significance of these facts is not known. The stellate cells appear to contain larger amounts of inorganic substances than the hepatic cells. The stellate cells often contain a large amount of iron which is derived from hemoglobin. Hemoglobin is taken up by the stellate cells as well as by the reticulo-endothelial cells situated in other tissues of the body, disintegrated, the iron retained in the cell and bile pigment formed from the pyrole portion of the hemoglobin molecule.

The liver is also a factor in the metabolism of water, although the extent and significance of its activities in this respect are not known.

The best known function of the liver is the secretion of bile. Knowledge in regard to the mechanism of bile secretion is not complete. It is known that, differing from the other glands that pour their secretions into the gastro-intestinal tract, the liver secretes bile more or less continuously although the rate of secretion varies. Some of the variability in rate of secretion of bile is owing to the changes in activity of the gastro-intestinal tract associated with the intake of food, but for the most part the causes of the changes in rate of secretion and concentration of the constituents of bile are not known. Bile has three main constituents: cholesterol, bile pigment and bile acids. Very little is known concerning the relation of the liver to cholesterol. Bile pigment, as previously stated, is formed from hemoglobin in the cells of the reticulo-endothelial system and is excreted as a waste product in the bile. The bile acids are not only made in the liver, but may be destroyed there. They are important in the absorption of fat and possibly of certain vitamins.

The liver is an important factor in protecting the body from many injurious agents. The manner by which the liver accomplishes this is, for the most part, not understood. Some formed substances, such as certain bacteria, are removed from the blood stream by the stellate cells. Many other substances, carried in solution in the blood, are possibly absorbed or destroyed by the hepatic cells. Definite proof that the liver protects the body by absorption of toxic substances is lacking, but there are some suggestive observations in this regard. Certain poisons, such as chloroform and phosphorus, injure the liver more than any other organ of the body. This fact has been interpreted as evidence that the liver exerts a protective action, in which it becomes injured in protecting the remainder of the body by absorbing more than its share of the injurious substance. In a few instances it has been proved that the liver specifically destroys an injurious substance. Certain alkaloids, such as strychnine and nicotine, are for the most part destroyed in the liver. It has also been proved that the effect of many substances, which more or less specifically injure the liver, depends on the physiologic status of the organ at the time the poison

reaches it. A liver rich in glycogen is more resistant to most of these injurious agents than a liver poor in glycogen.

The liver has many functions less understood than those mentioned. It is probably the site of origin of the plasma protein or of the substances from which these proteins are made. It appears to be an organ that is essential for some of the factors necessary for the coagulation of blood, being the probable site of origin of both the fibrinogen, or its precursor, and of some of the prothrombin. The liver elaborates one known substance, heparin, and is at least the storehouse for another very important substance, the factor essential in the treatment of anemia.

Pathologic Reactions of the Liver

The liver has a few fundamental characteristics which are of great importance in the development of some of the pathologic lesions of the organ. Chief of these characteristics is the capacity of the liver to be rapidly restored after injury or partial removal. Much of the hepatic tissue can be injured by a toxic substance and complete restoration will occur within a short time. Three-fourths of a normal liver can be removed without permanently reducing the total amount of hepatic tissue.

This capacity of the liver for restoration can be injured or abolished by loss of the portal blood to the organ, by prevention of the secretion of bile and by repeated injury with some toxic substances. In this regard the importance of the portal blood flow through the liver should be emphasized as the loss of this portion of its circulation appears to be a most important factor in decreasing the restorative ability of the organ. When the capacity for restoration is injured, it is possible greatly to reduce the amount of hepatic tissue.

There are numerous methods for producing pathologic lesions of the liver experimentally and it is possible to produce hepatic lesions which are the counterpart of some of the pathologic conditions of the organ as seen in the human being. Experimental investigations have demonstrated some of the causes of the vulnerability of the liver to certain toxins, the character of the hepatic reaction to injury and a few of the factors necessary for restoration, loss of which leads to a permanent pathologic state.

Experimentally it has been difficult to distin-

guish between the physiologic and pathologic fatty changes in hepatic tissue. An excess of fat in the diet, or fasting, will greatly increase the fat content of the liver. The addition to a fat diet of a substance such as alcohol, which produces a slight but definite pathologic condition of the liver, will greatly accelerate the accumulation of fat in the liver. Diversion of the portal blood from the liver or removal of the pancreas will increase the histologically demonstrable fat in the organ. Almost all of the toxic substances which injure the liver will change the amount of demonstrable fat in the organ. It has not been possible to distinguish, by histologic studies of the fat alone, between the changes in the fat in physiologic and in pathologic states.

In simple trauma to the hepatic tissue the stellate cell appears to be the most responsible agent in the process of healing. These cells come from adjacent regions and accumulate around the injury, wall it off and permit unmolested restoration.

When the secretion of bile is prevented, the hepatic parenchyma is gradually destroyed but biliary cirrhosis usually does not develop, although there is a marked difference in species of animals in this respect. In some species of animals, such as the rat, a seemingly true biliary cirrhosis occurs following occlusion of the hepatic duct.

Infection of the biliary tract, such as usually occurs when the bile is drained artificially into the gastro-intestinal tract by anastomosing the gallbladder and intestine or by implanting the common bile duct into the stomach or intestine, is followed by an atrophic cirrhosis which progresses until death occurs. This is the only type of cirrhosis produced experimentally, progress of which cannot be stopped.

There are many toxic substances which more or less specifically injure the liver. Recovery of hepatic tissue from a non-fatal dose of these substances is usually rapid and complete. Repeated administration of many of these substances rarely will cause the resulting lesion to progress beyond the acute stage. However, the repeated administration of a few of the hepatotoxins will readily produce characteristic cirrhosis. Progression of the lesion depends on the constant administration of the toxin. As soon as administration ceases, the lesion either remains

stationary or more often a considerable degree of recovery occurs.

Many factors appear to affect the rate of development of, and the character of, a hepatic lesion. Mention has been made of the importance of the physiologic state of the liver in relation to the extent and character of pathologic reactions. In this connection it should be noted that the liver undergoes definite cyclic changes each twenty-four hours. These changes are related to the ingestion of food. The weight of the liver begins to increase soon after taking of food, reaches its initial maximum in about six hours, decreases transitorily, and then again increases to a level as high as, or higher than, the initial one, followed by a decrease to the fasting value. Thus the curve is definitely bimodal in character. Chemical analysis of the better known constituents of the liver shows that the concentration of these substances follows similar rhythmic variations.

Diet is one of the most significant factors which appear to affect the rate of development and character of a hepatic lesion. An animal with complete obstruction of the biliary outflow will not infrequently live many months if maintained on a carbohydrate diet, while the length of life of an animal in this condition and receiving a meat diet is usually only a matter of weeks. An animal which is receiving a standard amount of carbon tetrachloride and a carbohydrate diet will be alive and in good condition many months after its kennel mate, receiving the same amount of drug but a meat diet, has died. While in both instances a definite hepatic lesion will develop, when the diet is of meat the pathologic process develops very much more rapidly and is more severe. If an animal is receiving a fat diet, the fat content of the liver will increase, but if alcohol is administered with the fat not only will the store of fat in the liver increase much more rapidly with the same amount of fat in the diet, but the general effects of the alcohol are much greater than if the animal had been receiving a carbohydrate diet. Other instances could be given, showing the dependence of hepatic activity on the reaction to diet.

As previously mentioned, the hepatic pattern, that is, the architecture of the organ, as visualized by delineation of the supporting tissue of

the organ, is a most important histologic characteristic of the liver. A very valuable method of studying the development of a progressive lesion of the liver is to make successive observations in regard to the changes in pattern of the organ. When a single non-fatal dose of a hepatotoxin is administered the resulting lesion usually heals completely without any permanent change in hepatic pattern resulting. However, with repeated administration of the toxic substance, the pattern of the liver is not restored to normal and cirrhosis develops. A study of the change in hepatic pattern during the development of the lesion not only makes it possible to visualize the manner in which the liver reacts to injury, but makes possible the interpretation of many of the features seen in the fully developed lesion.

It is not possible in the scope of this talk to give a complete picture of the process of development of cirrhosis, but the pertinent facts determined by a study of the hepatic pattern can be presented. The most important change in the pattern of the liver that occurs after repeated injury to the hepatic lobule is the failure of restoration of the normal vascular relationship. Since restoration of hepatic tissue appears to depend in a great measure on the flow of portal blood, one of the important factors limiting the continued restoration of hepatic tissue after injury is the failure of establishment of the normal vascular relationship in the repeatedly injured hepatic lobule. A small portion of the large increase in the supporting tissue in cirrhosis is owing to the formation of new connective tissue, stimulated by the exciting agent and the resulting products of injured hepatic tissue. But most of the increase in the tissue constituent in cirrhosis, which has given origin to the name of the condition, is made up of the remains of the supporting framework of the lobules which have been destroyed. A new supporting framework is formed to support the hepatic cells in each attempt at restoration of the lobule and after each repeated injury the supporting tissue is shoved aside by the new attempt at regeneration and accumulates as more or less dense bands around the regenerating portion. In some regions of the cirrhotic liver there are accumulations of bile ducts which appear to indicate an overgrowth of these structures. In some specimens large bile ducts are found on the surface

of the organ. A study of the hepatic pattern shows that these bile ducts, like the supporting tissue, are the remains of lobules and of whole portions of the liver which have been destroyed in the process.

Function of the Permanently Injured Liver

Since the surgeon is usually dealing with individuals who are afflicted with a pathologic condition he is more interested in the physiologic activity and capacity of the diseased liver than in the normal organ. Experimental investigations have added to knowledge concerning the physiologic status of the permanently injured liver but such knowledge is not of great practical value to the surgeon at present. It has been learned that there is a dissociation of functions of the liver; that is, a pathologic condition may injure one function of the organ to a much greater extent than its other functions. It has also been discovered that whereas loss of all the hepatic tissue may totally stop several important physiologic processes, decreasing hepatic tissue, either of the normal organ or of an organ in which cirrhosis has been produced, does not decrease these functions a measurable amount. It would appear that only a small amount of hepatic tissue, even if pathologic processes have occurred in it, is necessary to carry on all the functions of the organ. While it would appear that since the liver has so many functions it would be possible to measure some of them, so far it has not been found possible to quantitate any one of them.

Significance of the Liver to Surgery

It is difficult and often impossible to apply the known facts concerning hepatic physiology and pathology to the problems in which the surgeon is interested. A few examples can be presented to illustrate the potential importance of the liver to surgery.

While the importance of the character of food in relation to the liver has been repeatedly mentioned, it is of such particular significance in the consideration of the present subject that it merits special emphasis. Since the liver is essential for certain phases of metabolism of two, and possibly all three, of the major food-stuffs it is obvious that hepatic activity must be considered in all conditions and questions in which diet is a factor. Furthermore, the importance of diet is enhanced by the fact that

intake of carbohydrate supports hepatic function, prevents hepatic injury and thus aids the organism as a whole. The proper application of this knowledge should be of value in restoring and maintaining the best physiologic state as a preoperative preparation in certain surgical conditions.

The first procedure usually performed in relation to an operation, administration of the anesthetic agent, depending on the drug used, may involve the liver. If, as is rarely the case, chloroform is used, severe and possibly fatal hepatic injury may occur. The commonly employed anesthetic agent, ether, decreases the store of glycogen in the liver because the hyperglycemia produced by ether is owing to the liver. Ether also decreases the secretion of bile as well as depresses some other functions of the liver, notably the formation of urea. If the drug employed is procaine and possibly similar agents, hepatic activity is responsible for the destruction of a major portion of the anesthetic agent.

One of the occurrences in the operating room of paramount importance to the surgeon is hemorrhage. Herein the liver has an important rôle. The normal process of coagulation depends on hepatic activity. The liver is also responsible to some extent for the restoration of fluid volume.

The liver is probably always either directly or indirectly involved in jaundice, which is often a

serious complication of surgical conditions. Ascites is another condition in which the liver must always be considered, although hepatic involvement in ascites is probably not as simple as is usually thought. Finally, it should be noted that in common with a condition of insufficiency of certain ductless glands a marked decrease in hepatic function is often associated with failure of wounds to heal.

Interdependence of the Surgeon and the Investigator

I have tried to summarize the work of more than twenty years during which Dr. Judd and those of us who are engaged in experimental work jointly pursued investigations on the liver. As I have indicated, the fresh, practical, surgical viewpoint of Dr. Judd was invaluable to us and, as you have perceived, some of the conclusions reached in the laboratory have been applicable in the operating room. I hope that to those of you who are students in the medical school, the factual aspect of this review will prove to be of some service. But the inferences from present facts will change as new facts are brought forth. Perhaps the most worthwhile thought I can leave with you is that advantage accrues to the patient if those whose work lies in the operating room, and those whose lives are spent in the experimental laboratory, frequently visit one another and frequently confer.

CHANGES IN THE AORTIC CONTOUR FOLLOWING INJURIES TO THE SPINE*

M. H. TIBBETTS, M.D.

Duluth, Minnesota

MODERN x-ray technic has clarified and simplified many problems of diagnosis by giving better definition and greater contrasts. As recently as 1918 a lateral view of the fifth lumbar vertebra was impossible because of the over-shadowing pelvis. Now it can be visualized with great accuracy. This is given as a single example of the triumph of the fine focus tube and the bucky diaphragm. On the other hand

this finer detail brings into focus structures which demand interpretation. Soft tissue shadows have become distinct and must be diagnosed.

In 1929 while examining a man who had previously been injured it was noted that a shadow appeared in the x-ray film of the thoracic spine which looked like an enlargement of the descending aorta. Along with this was a compression of a lumbar vertebra which very definitely shortened the entire spine. Consultation with an in-

*From the Duluth Clinic. Read before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 5, 1936.

ternist strengthened the opinion that we were dealing with an aneurysm of the descending aorta.

Later on other compression fractures revealed

at which the aorta cannot readily contract, is likely to result in a greater portion of this vessel being seen to the left of the spine in the antero-posterior projection and behind the anterior edge



Fig. 1 (left), Case 1. Lateral view of spine showing fracture of second lumbar vertebra.

Fig. 2 (center), Case 2. Antero-posterior view of spine showing shadow to left of spine.

Fig. 3 (right), Case 2. Lateral view of spine showing aorta behind the anterior margin of the spine.

similar shadows in the thorax which stimulated a reconsideration of the original impression.

The descending thoracic aorta normally lies anterior to the vertebral column and the right border is not seen beyond the right margin of the vertebra. The left edge on the other hand may be seen to the left of the spine, at the upper limit of the arch, gradually approaching the left border of vertebra as it descends. Köhler³ states that any extension to the left greater than 2.5 cm. indicates diffuse dilatation or aneurysm. The distance of the left border of the aorta from the spine should decrease from above downward. The above comments apply to anteroposterior views. In the lateral projection the descending portion of the arch may be seen slightly posterior to the anterior limit of the vertebra, but as this merges into the descending aorta we find this vessel lying on the anterior surface of the spine.

As age advances, the arteries of all individuals become less elastic. The aorta shares in this characteristic. As a consequence, when the two extremities of a vessel come closer together, the intervening portion, if unable to contract, must bow outward or become kinked. The more suddenly this shortening occurs, the more marked will be this lack of straightness. From these facts it would seem reasonable to conclude that any condition which causes a shortening of the spine in an individual who has attained that age

of the spine in the lateral view.

The changes in the spine which may bring this about are:

1. Compression fractures, either traumatic or pathological.
2. Osteoarthritic changes with wedging of the individual vertebra, and
3. Extreme narrowing of the intervertebral discs.

Marked kyphotic changes that occur gradually over many years will, as a rule give the aorta time to accommodate itself to the new shape so that there may be no deviation to the left. A long paravertebral abscess may simulate the aortic shadow. This, as a rule however, appears on both sides of the column rather than to the left. Rare fusiform malignant growths from the side of the vertebra must be kept in mind. Usually the character of the vertebral involvement will eliminate this.

In checking over the literature very little could be found bearing directly on this subject. There are references to an elongated and tortuous aorta. Rösler of Vienna and Paul White⁴ of Boston wrote an article for the August, 1931, issue of the *American Heart Journal* on "A Condition Due to Elongated and Calcified Aorta." They describe several cases in none of which was there any history of injury, but there was evidence of osteoarthritic changes in the spine. We know that the spine usually shortens in this

condition and is it not reasonable to believe that the shortened spine rather than the elongated aorta caused the tortuosity?

R. Heigl² describes a man whose x-ray ex-

amination shows a well developed and well nourished man past middle life. Eyes react to light and accommodation. Throat in good condition except for a moderate amount of pyorrhea. Chest and abdomen normal. No abnormal reflexes. Examination



Fig. 4 (left), Case 2. Lateral view of spine showing aorta behind the anterior margin of the vertebra.

Fig. 5, Case 2. Antero-posterior view of spine showing aorta to left of spine.

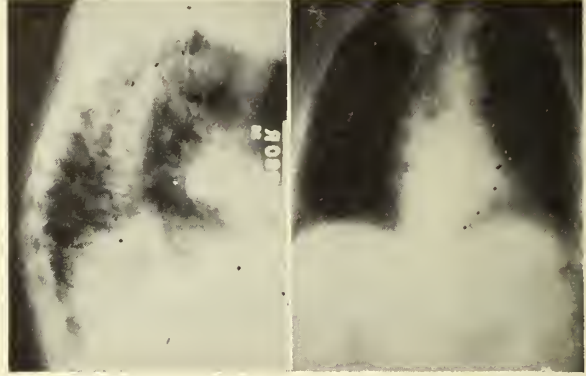


Fig. 6 (left), Case 3. Lateral view of spine showing aorta behind anterior margin of spine and showing compression of ninth thoracic vertebra.

Fig. 7 (right), Case 3. Antero-posterior view of spine showing aorta to left of spine.

amination showed a fracture of the twelfth thoracic vertebra with bending of a calcified descending aorta. This was found during the course of a compensation examination as was the first case. Incidentally this man had lues and he was diagnosed luetic aortitis. This is the only direct reference to our subject that I could find.

When we consider the importance of this shadow, we are led to believe that to recognize it is its chief meaning. We must be sure that it is not an aneurysm or an abscess or a neoplasm. As far as we can determine, it gives rise to no symptoms. It, *per se*, requires no treatment.

Case 1.—C. E., a laborer, aged fifty-nine, was first examined on March 20, 1929. He complained of pain in the back and hips and inability to bend forward. On May 4, 1928, he had fallen from a dock eight or ten feet high. He was unconscious for a short time and was then taken home and put in bed. There he remained two weeks. Subsequently he was given diathermy, but was unable to return to work because of pain in the back.

As to family history, the father had died at the age of fifty-two, cause unknown. The mother had died at the age of sixty-three, cause unknown. Two brothers had died of tuberculosis, one at twenty-one and the other at twenty-three. One brother had died of smallpox at the age of seven and another brother had died of heart disease at sixty-seven. Two sisters are living and well. The patient is married and has five children.

of the spine shows prominence of the upper lumbar region with some increase in the thoracic kyphosis. Motions are restricted in all directions. X-ray reveals a compression of the first lumbar vertebra. The aorta can be visualized in the lateral projection extending posteriorly to the anterior margin of the vertebra. In the anteroposterior view there is a bulging shadow to the left of the spine seen through the heart shadow. Fluoroscopic examination showed this shadow to pulsate. An internist was consulted, who felt that this was an aneurysm of the aorta. A blood Wassermann was negative.

The diagnosis arrived at then was compression fracture of the first lumbar vertebra and aneurysm of the aorta. This diagnosis, we now feel, should be changed to kinking of the aorta with no dilatation.

Case 2.—Mrs. J. B. C., aged sixty-five, married, has four children living and well.

Her father died at ninety-eight and mother at eighty-nine. One brother living and well; one sister died of a cause unknown.

Her complaint when first examined June 3, 1935, was pain in back and difficulty in walking.

At Christmas time (1934) she had fallen on the stairs and was unable to get around for several weeks.

Present Examination: General findings negative—Examination was negative except that there was a prominence of the spine in the midthoracic region. Movements were restricted and painful. The knee jerks were exaggerated on both sides.

X-ray shows a compression fracture of the eleventh thoracic vertebra. The aortic shadow was similar to Case 1.

Case 3.—Mr. C. W., aged seventy-four, a widower, had three children living and well. He had been a teamster but was retired.

He came for examination February 7, 1934. He had fallen on the street five days previously and had had much difficulty in arising and much pain in the back which had persisted. The main interest in the examination in this instance was the x-ray findings of compression fracture of the twelfth thoracic vertebra. Here again we find an aortic shadow that is abnormal. We find it more prominent to the left in the antero-posterior view and further back in the lateral view. A subsequent check up two years after the accident revealed compression of two more vertebra at a higher level. (Wassermann negative.)

Case 4.—Mr. P. B., aged seventy-five, married, seven children. The patient was in an auto accident two months before the examination which was made in December, 1927. The interest centers chiefly in the x-ray findings which revealed osteoarthritis and a compression of the eighth thoracic vertebra. Aside from this the aorta is plainly visible extending behind its normal position in the lateral view and to the left in the anteroposterior view.

Summary

1. A shortening of the spine, such as that resulting from a compression fracture of a vertebra, may cause a displacement of the shadow of the aorta which with the newer x-ray technic may be seen to the left and posterior to its usual location.

2. Little corroboration of this finding has been found in the literature.

3. Its main importance lies in the avoidance of a faulty diagnosis of aneurysm, mediastinal abscess or tumor.

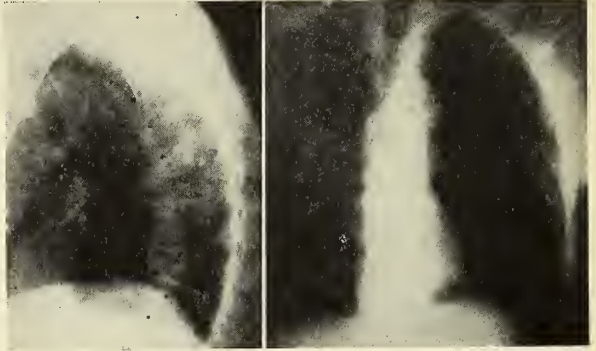


Fig. 8 (left), Case 4. Lateral view of spine showing aorta behind anterior margin of spine.

Fig. 9 (right), Case 2. Antero-posterior view of spine showing aorta to left of spine.

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CONGENITAL CARDIAC DEFECTS*

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IN recent years, the subject of congenital cardiac defects has passed from being a matter of merely academic interest, to one of great scientific importance in the diagnosis and treatment of cardiovascular disease. This fact is borne out by the prominence that is given to this phase of cardiac disease in the recent monthly bulletins of the American Heart Association. These articles have been written by Dr. Maude Abbott,¹ who has given this subject much careful study, and has written monographs and many articles as a result of these observations. It is hoped that this brief article will serve to arouse a more general

interest in the profession toward this important branch of cardiology.

Incidence.—Congenital heart defects are either on the increase, or they are more frequently diagnosed. Phillpot found in 7,200 autopsies following death from all causes, an incidence of 1.1 per cent of congenital cardiac anomalies. Others have found a similar ratio. The largest ratio was found in the earlier months of life. This, however, does not lessen its importance to the internist, who is to be on the alert and able to arrive at a differential diagnosis of any cardiac lesion. Many of these individuals live to the full three score and ten years span of life, and

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must be treated as intelligently as any other type of heart disease.

Classification.—The clinical classification has been based upon the pathologic physiology of the circulation as altered by the defect present, and the special symptoms thereby induced. This classification made by Abbott and Dawson has been fully recognized by cardiologists as the most acceptable up to the present time. They place them in three groups as follows:

- I. *Acyanotic Group.* Cases in which there is no abnormal communication between the two circulations, so that no cause for cyanosis exists, but the anomaly is the seat of strain.
- II. *Cyanose Tardive.* Cases in which there is absence of cyanosis, except as a transient or terminal feature. These are the localized cardiovascular septal defects, patent ductus and foramen ovale, in which there occurs an arterial-venous shunt from left to right through the defect, with possible terminal reversal of flow.
- III. *Cyanotic Group.* Cases presenting constant, progressively increasing cyanosis, due to a permanent venous-arterial shunt, or prolonged deoxygenation in the capillaries, the result of grave structural changes, and giving rise to the familiar symptom-complex of persistently raised oxygen-unsaturation.

The Most Common Defects.—The congenital defects are listed below in the order of frequency as reported by Christian,³ Abbott¹ and others:

1. Patent foramen ovale.
2. Defects of interventricular septum (maladie-de-Roger).
3. Patent ductus arteriosus (Botalli).
4. Coarctation of the aorta.
5. Pulmonary stenosis.
6. Anomalies of semilunar cusps.
7. Complete transposition of arterial trunks, with or without interventricular septal defects.
8. Complete defects of cardiac septa.

To these may be added the following anomalies:

1. Dextrocardia.
2. Congenital enlarged heart.

3. Congenital small heart. The extreme "drop type." We have added the small heart to this list, as our experience has shown that the extreme "drop type" of heart constitutes a handicap almost as serious as some of the other forms of cardiac defects.

Several combinations of these anomalies often occur, such as those that comprise the tetralogy of Fallot, namely, pulmonary stenosis, defective interventricular septum, dextroposition of the aorta, and enlargement of the right heart.

Etiology.—No definite etiological factors have been determined. In the cyanose tardive (Group II) cases, the arrest of development has occurred before the end of the eighth week of fetal life, while arrest of development in the acyanotic (Group I) cases occurs after that time. Myocardial and endocardial disease in early fetal life are considered possible. Toxins due to alcoholism, syphilis, and maternal infection are important factors. Weakness of the germ plasm due to consanguinity and obscure hereditary factors must be considered important in the etiology. Neglected and improper prenatal care of the mother undoubtedly must be considered one of the chief causes of these cardiac defects.

Symptomatology and Diagnosis.—In this brief paper, we can only call attention to some cardinal or salient points. The individual is of the "gracile" type, with a tendency to effort syndrome. The cardiac signs are found in early childhood, and cannot be traced to a definite illness of the type that causes cardiac disease. The loud murmurs at the base of the heart are far out of proportion to the signs of cardiac failure. Persistent cyanosis from infancy, with clubbing of fingers and poor physical development, definitely places the case in Group III. Undue cyanosis in times of stress of the pulmonary circulation, such as in pneumonia, gives a valuable hint as to the strong possibility of its being a case of defect of the "cyanose tardive" group. The reader is directed to the extensive literature on this subject, for further elaboration on the various types of murmurs and their significance.

The x-ray and the electrocardiogram are valuable adjuncts in the diagnosis of these defects. In coarctation of the aorta, there is the enlarged aorta with erosion of the ribs. Higher blood pressure in the upper than in the lower extremities.

ties completes the picture. The large pulmonary conus in patent ductus, and the enlarged right heart in the tetralogy of Fallot, and other septal defects with pulmonary stenosis, are among the recognized x-ray findings. The electrocardiograms usually show a wide range of the Q R S complexes in two or three leads. There is a marked right ventricular preponderance, and a high P wave in Group III, and often in Group II. In Group I, there is usually a left ventricular preponderance, and frequently, there is an inversion of the T wave in one of the leads.

Complications.—Briefly speaking, these hearts are subject to the same diseases as the normal hearts, but they are more susceptible to intracardiac infection, such as those produced by the streptococcus hemolyticus and viridans. Valvular infections with extensive vegetations and subacute bacterial endocarditis very frequently are the cause of death.

Treatment.—Early diagnosis is essential in order that unnecessary digitalization and other cardiac stimulation may be avoided. These measures are useless until conditions arise that usually cause cardiac failure, and then the treatment should be the same as that employed for any impending cardiac decompensation, for the areas of the defects are prone to become involved by any infection that may tend to involve the heart. These patients should be reassured and their affliction should not be stressed, in an effort to avoid the invalidism and mental depression to

which they are prone. They must, of course, follow a carefully regulated life and be protected as far as possible from infections. Lighter forms of occupations, mostly of the sedentary type, should be planned for these young people. Such debilitating conditions as obesity and mental stress should be avoided as far as possible. Physical exercise should be regular, but moderate. Those of the acyanotic group should be encouraged to believe that a normal span of life awaits them.

Prevention of these defects may be possible by paying more attention to prenatal care, and avoidance of infections in the mother during pregnancy.

Conclusions

1. Congenital defects of the heart are not so rare that special interest in them should be lost by the general practitioner.
2. A more thorough understanding of the clinico-pathologic aspects of this special branch of cardiology is to be encouraged.
3. Early diagnosis is essential to the proper management of those afflicted with cardiac defects.

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COARCTATION OF THE AORTA*

Report of Two Cases

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Duluth

CASE reports of coarctation of the aorta with pathological findings have been appearing with considerable frequency in recent years. I doubt, however, whether the average doctor has any clear mental picture of the clinical findings in an infant or child in whom this condition is to be suspected. The purpose of this communication, therefore, is not to review the literature but to concentrate on the clinical features of two

cases which illustrate unusually well the two types of this condition. I shall, however, report the pertinent pathologic findings in detail. For the drawings carefully made from the actual specimens, I am indebted to Dr. L. L. Merri-man of Duluth.

Case 1. This is the case of a bright, active lad, eight years of age, who dramatically dropped dead while his mother was dismissing him for school.

K. S., a boy then five and a half years of age, was

*Read before the St. Luke's Hospital Staff, Duluth, Minnesota.

first brought to my office in July, 1930, for suspected "heart trouble." The mother stated that her suspicions were aroused because she had noted the loud pounding of his heart when he slept with her at night. She stated, however, that he was extremely active and had seldom

parent change in the heart outline. The blood pressure was: systolic 116, diastolic 76. The bruit seemed softer and less intense.

The continuance of a constantly normal rectal temperature and the absence of any real disturbance due to exertion, made it practically certain that we were dealing with a congenital lesion. An x-ray picture taken about this time was somewhat disturbing, however. It showed a moderate increase in the total width of the heart with enlargement especially of the left auricle and left ventricle. It suggested a mitral type of lesion.

During the whole following year (1933) there was little change in his condition. His weight increased the normal amount and he was, if anything, more than normally active. At one period in this year he developed a cough which was suspected but not proven whooping cough. This passed with no apparent bad effects.

In 1934, I saw him only once. He was then seven years old and weighed 60.5 pounds. His height was 51.25 inches. His pulse at rest was 84, after exercise 90. His hemoglobin 85 per cent, red count 5,850,000, blood pressure 140/100. The bruit had changed very little if any. It seemed somewhat more rumbling in type. Both second sounds were markedly exaggerated.

On February 24, 1935, this boy played unusually hard and among other things, climbed to the top of a lofty ski-scaffolding. He slept restlessly that night but the following morning was up as usual and ate his breakfast. As he was about to leave for school and while his mother was assisting him with his clothes and books, he suddenly dropped to the floor, dead.

The autopsy disclosed a rupture of the ascending arch of the aorta. This, with the resultant hemopericardium, was the direct cause of death.

The autopsy, done by Dr. George Berdez, was complete in every detail, save that the examination of the brain was not permitted. I cite only the pertinent findings.

"The cavity of the pericardium contains 500 c.c. of partly clotted blood. The heart weighs 240 gms. The ascending aorta is very much dilated and measures up to 11 cm. in circumference. At 3.5 cm. above the aortic valves, the lateral and posterior aspect of the ascending arch shows an oblique tear with somewhat ragged edges measuring up to 1.1 cm. in length, which sets a wide communication between the lumen of the aorta and the pericardial cavity. The aortic valves are slightly fused by their lateral margins. They are somewhat irregularly thickened. The intima of the arch of the aorta is irregularly thickened and shows pale, cloudy, yellowish deposits in places. The circumference of the aortic rings measures 7 cm. in length. The wall of the arch of the aorta is irregularly thickened mainly in the concavity of the arch, while the convexity shows thinner areas. The ductus arteriosus is closed and just below the point where the ligamentum arteriosum is attached to the aorta, there is a marked diaphragm-like stricture of the aorta. The internal circumference of the stricture measures 0.6 cm. in length. The 2 cm. of the aorta above the stricture are narrower than the rest of the arch. The branches of the aortic arch show the usual disposition. In addition, a smaller

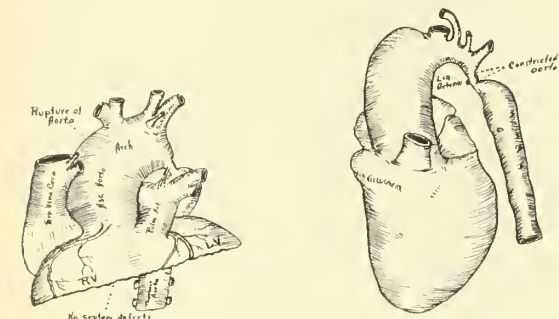


Fig. 1 (left). Coarctation of the aorta (adult type). The stricture is just distal to the ductus arteriosus which is closed. Both ventricles are hypertrophied. The ascending aorta and arch are very greatly dilated. The thoracic aorta is normal in size. The pulmonary artery is not enlarged. The mitral valves are normal. There are no septum defects. The branches of the thoracic aorta are definitely enlarged, as are also the internal mammary arteries. An aberrant artery arises between the left carotid and left subclavian.

Fig. 2 (right). Same specimen as shown in Figure 1. Drawing made from mounted specimen. The ligamentum arteriosum is severed and the aorta stretched out to show relationship of the stricture to other structures.

been ill. He had previously had tonsillitis twice, mumps and influenza.

Physical examination showed a well developed boy of good nutrition and rather high color. He was bright, rather precocious in fact, and of nervous type.

The tonsils were small and apparently normal. There were no enlarged glands. The teeth were normal. The nose was normal although the history pointed to some allergic rhinitis at times. The lungs were quite clear and there was nothing in his examination of interest except that which related to the heart. This organ was definitely enlarged and the apex beat was displaced decidedly to the left. There was a marked visible impulse. At the apex a short systolic bruit, not well transmitted to the axilla, could be heard. This bruit became more pronounced toward the base and was very loud over the pulmonary and aortic areas. There was no exophthalmos and no enlarged thyroid. A systolic blood pressure of 160 was noted. It was felt that a congenital condition was likely present but that only time and observation could rule out an acquired lesion.

When seen again a few weeks later the same plain systolic murmur was heard, loud and vibratory over the base. Such a bruit would suggest the persistence of a Ductus Botalli as one of its elements. The systolic pressure was 130 at this visit; the pulse 96.

After several months he was seen again (October, 1932). The mother stated a few things not mentioned before, namely that he did complain somewhat of pains in his legs at night time and that he was inclined to be irritable and rather easily fatigued. There was no ap-

artery leaves the arch between the openings of the left carotid and the left subclavian artery. The aorta below the stricture shows almost immediately a normal width again. The openings of the intercostal arteries below the stricture seem to be slightly wider than usual at this age. The lower edges of the ribs show no unusual groove formation.

"The foramen ovale is closed. There are no septum defects between the ventricles. The walls of both ventricles are hypertrophic. The wall of the left ventricle measures up to 1.7 cm. in thickness. The wall of the right ventricle measures up to 0.5 cm. in thickness. The pulmonary valves are also slightly thickened. The mitral and tricuspid valves show nothing of note. The myocardium is pale. The heart is contracted. The cavities of the heart contained only a little partly clotted blood.

"The left lung weighs 240 gms. The right weighs 300 gms. Both are somewhat congested but air containing throughout. Edema grade I of posterior parts."

Anatomic Diagnoses: (a) Coarctation of the aorta (adult type) and stenosis below (beyond) the point of attachment of the arterial ligament; (b) dilatation of the arch of the aorta; (c) hemopericardium (500 c.c.); (d) congestion of lungs.

Case 2.—This is a case of coarctation wherein the major clinical feature was the inability of the subject to establish normal growth and weight; that is to say, the condition was one of cardiac infantilism.

Lorraine T. was born January 31, 1935. She was the fifth child. Of the other four children, one had died immediately after birth, one was stillborn, while the third and fourth were normal.

The birth weight was 3,220 gms. (7 pounds 2 ounces). The infant, therefore, was of good nutrition at birth, indicating that intrauterine conditions were favorable for the fetus. After birth, however, less satisfactory conditions prevailed. For three days nothing abnormal was noted. Then there occurred some slight twitchings followed by temporary spastic contractions of the arms and legs. During this attack there was slight cyanosis. But the attack was not repeated on the succeeding days, and when the baby left the hospital on the eighth day, it weighed 3,035 gms. The baby was getting very little from the breast and it was necessary to complement the feeding.

The mother soon reported that the baby was vomiting and refused its bottle or the major portion of it. This was a true dysphagia although we did not recognize it as such at first.

At two months of age the baby weighed less than at birth and it was taken to St. Mary's Hospital for study. The following conditions were noted: marked pallor, protruding sternum, loud pounding cardiac systole, difficulty in swallowing. Already the infantile stamp was on the baby, that is, there was a symmetrical smallness of all the features and limbs. There was no evidence of rickets. The heart sounds were clear but markedly exaggerated. A decided enlargement of the heart was noted but there was no definite bruit. Shortly after this, however, a definite thrill was re-

corded and a diastolic bruit over the pulmonary area was noted. This suggested a patent foramen ovale.

The dysphagia continued and was uninfluenced by the type of food. A peculiar cough, resembling an aneurysmal cough, also appeared.

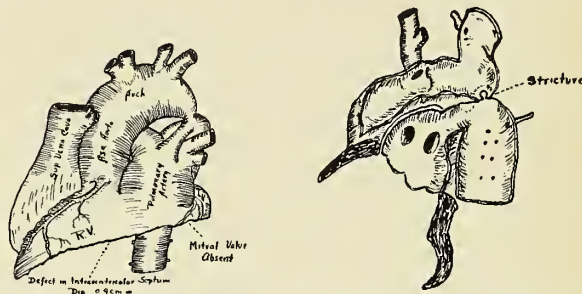


Fig. 3 (left). Coarctation of aorta (infantile type). The stricture of the aorta is proximal to the ductus arteriosus, which is widely patent. The right ventricle is markedly dilated and very hypertrophic. The left ventricle is small. The ascending aorta and arch are moderately dilated. The thoracic aorta is about normal in size. The pulmonary artery is very greatly dilated. The mitral valve is absent. An interventricular septum defect is present and also a patent for ovale.

Fig. 4 (right). Same specimen as shown in Figure 3. Drawing made with aorta, pulmonary artery and ductus arteriosus opened up.

The large size of the heart and the comparative absence of bruits seemed hard to explain. A pulmonary stenosis combined with a patent ductus and a patent foramen ovale might explain the enlargement but the exaggerated clearness of the sounds and the almost complete absence of bruits were hardly compatible with this conception. The possibility of an ante natal pericarditis was discussed, as was also the possibility of a so-called congenital hypertrophy of the heart.

An x-ray taken on April 11, 1935, showed no evidence of fluid but a generalized cardiac enlargement. The base of the heart was enlarged both to the right and the left. There was no evidence of disease in the lungs or the esophagus.

The blood findings were: hemoglobin 78 per cent, red count 3,900,000, white count 7,300. The polymorphonuclear cells numbered 61 per cent and the lymphocytes 34 per cent.

In August, 1935, at the age of seven months, the weight was only 8 pounds 6 ounces. There was now evident a decided systolic murmur, heard best over the mid-cardiac region. The afore-mentioned diastolic bruit could also be heard. The second sounds seemed even more exaggerated.

Various formulas and methods of feeding were tried but it was impossible to cause any consistent gain. Always anorexia and dysphagia would ensue. Tube feeding was also unsuccessful. In October, at the age of nine months, the weight was nine pounds. The baby now presented the typical picture of infantilism. She was comely and intelligent but there was symmetrical smallness of all the features and members.

The greatest weight attained was 10 pounds. The baby died at eleven months of age.

Again I give just the pertinent findings at autopsy.

The autopsy, done by Dr. George Berdez, was complete in every detail.

"The heart is at least twice the normal size. The left atrium contains some fluid blood. *There is complete absence of the mitral valves.* The left atrium communicates with the right atrium through an opening measuring .3 cm. in diameter (foramen ovale). The left ventricle is small and communicates with the right ventricle by a round opening .9 cm. in diameter (interventricular septum defect).

"The right atrium is dilated and the right ventricle markedly dilated and hypertrophied. The pulmonary artery below the bifurcation is very dilated. The ductus arteriosus is patent and is the size of a small pencil. The aortic valves are thicker than normal. The ascending aorta and arch as far as the left subclavian are dilated. From the left subclavian to the ductus the arch is very much narrowed. It is not closed but a small opening (.2 cm.), proximal to the ductus, persists. The effect is that of a diaphragm with a small central aperture. The endocardium of the left atrium is markedly thickened.

"The esophagus shows nothing abnormal and there are no other abnormal findings."

Anatomic Diagnoses: (a) Coarctation of the aorta (infantile type); (b) absence of mitral valve; (c) persistency of foramen ovale and of ductus arteriosus; (d) interventricular septal defect; (e) hypertrophy and dilatation of right ventricle; (f) congestion of lungs and spleen; (g) emaciation grade III.

Discussion

Represented here are the two types of coarctation of the aorta. The first case is an example of the adult type. The second case is an example of the infantile type.

In the adult type the obstruction lies beyond the ductus. There are usually no other major abnormalities. Life may be indefinitely prolonged. Death may ensue from mesaortitis, plaques, abscess in the wall of the aorta with dissection. Rupture into the pericardium may occur. Cerebral hemorrhage may also be a cause of death.

Certain striking clinical signs may be demonstrable in the adult type. High blood pressure, higher in the upper than in the lower limbs, is one feature. Rib erosion, resulting from enlarged intercostal arteries, may be prominent. The florid complexion, the striking collateral circulation, the heart findings clarified by x-ray should help in making the diagnosis, if one is thinking of the condition. Oblique fluoroscopy or film may bring out the lack of aortic knob or perhaps a break in the continuity of the arch.

To be looked for also are abnormal pulsation in the neck with absence of pulsation in the abdominal aorta, femoral or popliteal arteries.

This very pulsation in the neck, with the flushing and hypertension; has lead to erroneous diagnosis of hyperthyroidism. The presence of abnormal collateral circulation involving the intercostal and mammary arteries should always cause suspicion. Marked pulsation and even hemorrhage may show in the fundi.

In the infantile type we have anatomical conditions which are incompatible with prolonged life. Here the right ventricle supplies blood (per ductus) to the descending aorta. In fetal life conditions are satisfactory. However, after birth, when the pulmonary circulation assumes primary importance, there is insufficient supply to the vital abdominal organs. In this type, as Ballantyne has well pointed out, there is not the incentive to form an adequate collateral circulation as in the adult type. When the obstruction is beyond the ductus (adult type) it is imperative to build up adequate collaterals even in fetal life. Failure to do this would be incompatible with growth and development. But in the infantile type circulation is sufficient until after birth. Then, as the blood which was reaching the abdominal aorta by way of the pulmonary artery and ductus arteriosus is now diverted to the lung, it is evident that the abdominal organs will be correspondingly robbed of nutriment.

Other factors also play a part. There is always suboxidation when there is a single ventricle (as in this case). Many congenital anomalies occur in this infantile type and auscultation may be extremely confusing. A patent ductus will show a rough systolic bruit near the pulmonary area with the pulmonic second sound accentuated and the presence of a decided thrill. Both bruit and thrill developed slowly here, probably waiting an hypertrophy of the ventricles. All in all, the whole clinical picture has to be grasped.

The incidence at autopsy of both types is 1 to 1000.

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RHEUMATIC HEART DISEASE*

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RHEUMATIC fever has frequently been considered an acute disease, but although its symptoms may appear suddenly and may occur as acute exacerbations, it exemplifies one of the most chronic infectious diseases known.

The typical features of rheumatic fever, such as increasing fever, toxemia, sweats, migratory involvement of large joints, and leukocytosis, are so well known that further emphasis would be unnecessary. At the end of three or four weeks, in many cases, the patient is apparently well and is able to return to work. The disease often appears to be self-limited. In many cases, the convalescence is not uneventful and, after a brief and variable period of normal temperatures and absence of leukocytosis, these signs reappear, and the pulse rate increases and is often disproportionate to the degree of fever. A systolic murmur may be audible over the cardiac area, and there may or may not be disturbances in the rhythm of the heart. These phenomena must at once direct attention to cardiac involvement. It is well to carry suspicion even further, because of the appallingly high incidence of carditis in rheumatic fever, and to consider the heart as participating in the disease until positive proof to the contrary is available.

It is not unusual, in practice, to observe patients with well marked mitral stenosis who deny ever having been afflicted with rheumatic fever or chorea. Since these lesions are so notoriously the result of rheumatic fever, the question is at once brought to mind whether or not such patients have suffered from rheumatic fever in one of its more unusual forms. Frequently, the patient dates his illness from an acute infection, which is said to have been influenza; yet it is known that bona fide cases of influenza have been exceedingly rare since the pandemics. Furthermore, it is known that cardiac injury, at least of the type simulating rheumatic carditis, did not occur with influenza. These observations may indicate that current, unidentified, infectious illnesses are in reality nonarticular forms of rheu-

matic fever. Sutton stated that of 427 boys and girls who had rheumatic cardiac disease, 18 per cent did not give a history of chorea, acute arthritis, or growing pains.

The primary attack of rheumatic fever may be followed immediately by a second attack, in all respects similar to the first, with recurrent, migratory articular involvement and with evident visceral participation. In cases of lesser recurrences, particularly, the therapeutic measures employed may modify the clinical picture sufficiently to mislead medical judgment. Control of symptoms and signs by treatment may erroneously be interpreted as being the result of spontaneous abatement of the disease, and premature activity on the patient's part may result disastrously. But before stressing the cardiac phases of rheumatic fever it may be well to consider the invasion of other parts of the body by the disease.

Fibrinous pleuritis not infrequently occurs in rheumatic fever, especially as a complication of rheumatic carditis. It occurs most commonly on the left side, probably because of the proximity of the pleura to the pericardium, although cases of bilateral pleuritis have been reported. The inflammatory process may be fibrinous or serous, and if effusion occurs it is in moderate amount only and aspiration rarely is required. The acute process subsides by organization of the fibrinous exudate and resulting obliteration of adhesions between the visceral and parietal layers of the pleura.

Rheumatic fever is sometimes accompanied by bronchopneumonia, or by lobar pneumonia, which may occur at any stage of the disease. I have seen bronchopneumonia occur almost coincidentally with exacerbation of rheumatic fever. Rabowitz described what he believed to be a pulmonary lesion characteristic of rheumatic fever. The lungs do not show pneumonic consolidation, but areas of congestion, edema, and atelectasis are present. Vascular lesions also exist.

Acute nephritis during the course of rheumatic fever is rare, although instances have been reported. Abnormal constituents of the urine dur-

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ing the acute infection, such as erythrocytes and casts, strongly suggest actual renal injury, and it is possible that the low incidence of nephritis signifies that virtually complete recovery of the kidney occurs in the majority of cases. Intimal lesions in the arterioles of the kidney identical to those observed in the pericardium were observed by Evans in a case of rheumatic fever; others have recorded similar observations.

The participation of the skin in the disease apparently often escapes detection. Small subcutaneous nodules may occur. They vary in size from 0.5 mm. to 0.5 cm., they are firm and usually painless, and they are most likely to be situated just under the skin, overlying such prominences as the patellas, elbows, dorsal surfaces of the hands and feet, skull, and vertebræ. The nodules are evanescent; they appear suddenly, remain a few days, and then disappear, although they may persist for several weeks or months.

The identification and description of rheumatic lesions in the blood vessels, especially by Klotz and by Pappenheimer and VonGlahn, have been valuable contributions to the subject and have, above all, emphasized the widespread distribution of the disease in the body. The lesions demonstrated by these workers were microscopic in nature and consisted of Aschoff's bodies or isolated Aschoff's cells in the adventitia of arteries. They found healed lesions, appearing as flame-shaped scars, in the media, and in later studies they found active lesions in the media of nutrient arteries. The walls of these arteries were thickened from swelling and proliferation of the endothelium and from cellular infiltration. Large collections of lymphocytes, polymorphonuclear leukocytes, and Aschoff's cells surrounded the vessels. The arteries that have been found to share in the disease are the aorta, the coronary arteries and their branches, and the arteries of the lungs; also involved are the aortic valve, kidneys, perirenal and perisuprarenal adipose tissue, testes, ovaries, pancreas, and intestines. Thrombosis of larger veins is observed occasionally. Aschoff's nodules also have been demonstrated in the diaphragm.

I have commented on the wide distribution of the disease to emphasize one of the prominent modern conceptions regarding it, for without this point of view the disease will continue to be overlooked in its nonarticular form.

As has been stated, the heart is involved in a

remarkably high percentage of cases of rheumatic fever. The incidence is so great that old, healed, rheumatic defects of the valves are one of the leading causes of cardiac death. Invariably, the endocardium, myocardium, and pericardium are involved, but not always in the same proportion. Tissues that through anatomic arrangement and physiologic demand are dynamic and bear stress have been shown to be favorite sites for the localization of lesions. This is particularly true of the heart and its structurally complex components. The endocardium apparently reacts to the rheumatic process in a manner similar to that of the endothelium of arteries.

In fetal life the cardiac valves contain vascular structures which apparently, in many cases, disappear with the advent of childhood. The persistence of these vascular structures in childhood and adolescence has been demonstrated by Kugel and Gross, Bayne-Jones, and Kerr and Mettier. It is believed that the persistence of vascular structures increases the likelihood of valvulitis. The subendocardium, below the juncture of the valves with the endocardium and the endothelium of the vessels, is also a region that is involved in the rheumatic process. Thus there are several possible ways in which valvular injury may occur: (1) by involvement of the investing endocardium, (2) by injury in and about the vessels of the valves, and (3) by lesions in the valvular rings.

The older conceptions regarding valvular injury were different from those held at the present time. It was believed that infection occurred primarily on the surface of the valve and extended by continuity into the deeper structures. Modern studies, however, have clearly disproved this view and have established the process as one of primary valvulitis.

The vegetations of rheumatic endocarditis are small and verrucous and occur at the line of valvular closure. In the mitral valve the entire line of closure is the seat of verrucæ; in the aortic and tricuspid valves, only a portion of the line of closure is involved. The vegetations heal at a very early stage, and in time become firmly organized. The great tendency for rheumatic endocarditis to produce stenosis is not adequately explained by cicatrization of the verrucæ, but the occurrence of interstitial valvulitis readily tends an explanation. Shortening of the chordæ

tendinæ by inflammation and by stress also contributes to the stenotic process.

A single attack of rheumatic fever may result in mitral stenosis, but the ultimate valvular deformity may not entirely result from the initial, acute infectious process. A low-grade and extremely chronic infection may persist for a considerable time, and lesser recurrent episodes occur that actually cause greater subsequent injury than that which results from the primary infection. This point becomes of great practical importance in the treatment of patients with rheumatic carditis. Pure valvular insufficiency is rare; yet occasionally such defects are disclosed at necropsy.

Many observers have demonstrated typical rheumatic lesions in the endocardium of the left auricle, and occasionally in the right auricle. The lesions extend upward from the root of the posterior leaflet of the mitral valve and resemble patches of endothelial thickening. Sometimes they are covered by a thin layer of fibrous tissue. The lesions are small, rarely extend 3 cm. in diameter, and ultimately become flattened areas of increased density. They contain Aschoff's bodies which occur in rows by virtue of the arrangement of the lamellæ of the elastic tissue; the result is a banded appearance.

The myocardium always participates in the disease. The characteristic lesions are Aschoff's bodies, which are rounded, fusiform, or spindle-shaped bodies in the interstitial substance, usually in the immediate vicinity of an arteriole. They are usually invisible to the naked eye. They occur in greater numbers in the left ventricle, particularly near the origin of the aorta, in the muscle in the vicinity of the mitral valve, in the apex near the septum, and in the intraventricular septum near the base.

Aschoff's nodules are composed of large cells surrounding a necrotic center; the cells are polygonal and contain one or more nuclei. Their presence is irrevocable proof of rheumatic fever, but their absence does not imply the converse because of the fact that they ultimately disappear. They are believed to exist for several weeks to several months, and ultimately they are replaced by scar tissue.

It is not definitely known at which stage of rheumatic infection hypertrophy of the myocardium occurs, although Coombs ventured the opinion that it begins while the signs of acute

carditis are subsiding. Dilatation and hypertrophy, to some extent at least, are direct results of myocardial involvement; they have been proved to occur in the absence of a valvular defect or of pericardial adhesions. With the addition of mechanical barriers, such as those imposed by stenotic lesions, hypertrophy may become very pronounced.

Some degree of fibrinous pericarditis is almost always an accompaniment of rheumatic carditis. It is usually part and parcel of pancarditis, although instances without endocardial involvement have been observed. The involvement may be patchy, but more generally it is diffuse. If exudation is profuse, it is churned by the heart's movement into transverse or oblique ridges, which gives the irregular, shaggy appearance of the so-called *cor villosum*. As organization of the exudate occurs, the pericardial cavity becomes obliterated, in part or entirely. In more severe infections, the inflammatory process may extend beyond the parietal pericardium and may produce adhesions to the diaphragm, pleura, mediastinum, and thoracic wall. This results in one of the most crippling mechanical barriers to which the heart may be subjected. The pericardium is also the seat of Aschoff's nodules.

The apparent predilection of rheumatic fever for the vascular structures at once brings forth the magnitude of this phase of the disease. The extensive involvement of the cardiac structures, in the majority of cases, emphasizes the seriousness of rheumatic carditis, the proof of which is found in the studies on mortality. The nature of the resulting mechanical barriers constantly subjects the heart to increased load, which is an important factor in subsequent cardiac failure. The chronicity of the infectious process and its tendency to recur are likewise provoking influences in promoting cardiac failure.

Numerous theories and hypotheses concerning the etiology of rheumatic fever have been advanced, but positive proof of a specific cause has not yet been presented. Little doubt remains that the disease is infectious, and in numerous instances strong evidence for its communicability has been presented.

Nonhemolytic streptococci have frequently been recovered from the blood, joints, cardiac valves, and pericardial fluid in rheumatic fever, and numerous investigators, particularly Poynton and Payne, Rosenow and Coombs and Clawson, asso-

ciate this organism with the etiology of the disease.

Inoculation of animals with streptococci isolated from patients with rheumatic fever has resulted in myocardial lesions that are similar to, but not identical with, Aschoff's nodules. On the identity of these experimental lesions rests, to a considerable extent, the controversy attending the hypothesis that streptococci are the cause of the disease. Subacute bacterial endocarditis has now been positively identified with the invasion of nonhemolytic green-producing streptococci, and the occurrence of this disease in such an unusually high percentage of cases in which patients have previously been afflicted with rheumatic fever has offered an alluring causal association. An immediate objection to this idea presents itself in the great differences in the reaction of the tissues to the two diseases. The lesions of subacute bacterial endocarditis are almost without exception embolic; the lesions of rheumatic fever are unmistakably of two types, exudative and proliferative, whereas embolic phenomena are rare except as they occur with subsequent cardiac failure.

These differences between rheumatic fever and subacute bacterial endocarditis have been explained theoretically as being due to differences in the number and the virulence of the organisms. Convincing proof of this allegation, however, is still lacking. Swift discussed three aspects of the etiology of rheumatic fever: (1) elective localization of streptococci, (2) elaboration by specific organisms, of specific toxins, and (3) rheumatic fever as an allergic phenomenon. He met the argument for elective localization with the objection that the disease is not limited but is as widespread as syphilis. The hypothesis of specificity of streptococci, as advanced by Small, is dependent on recovery of indifferent streptococci in blood cultures from some patients with rheumatic fever, on modification of the course of the disease by an immune serum prepared against these organisms, and on the effect of a vaccine prepared from them. Swift objected to these claims with the statement that they do not take into consideration the possible part played by other types of streptococci which have been recovered from blood cultures or tissues of patients, and that they do not consider the influence of other types of antistreptococcus serums or vaccines.

The studies of Hitchcock and of Nye and Seegal have shown that indifferent streptococci are found as frequently in the throats of nonrheumatic as in those of rheumatic subjects, and that the strains recovered from blood cultures belong to different immunologic groups. Swift and Kinsella, and Zinsser and Yu, have shown a multiplicity of cultural and immunologic types of streptococci, and Menzer, Cole, and Bull have demonstrated that strains recovered from patients with rheumatic fever produce the same lesions as do those strains obtained from the throats of nonrheumatic persons when such strains are injected in large numbers into experimental animals.

In recent years, investigators have been considering allergy as at least a factor in the etiologic problems of rheumatic fever. Swift looks on the allergic hypothesis as a reasonable explanation which may account for the disagreement regarding the infecting organism. The investigations of Swift and his coworkers, regarding allergy are of interest, and merit careful consideration. They found that, in rabbits, the production of focal lesions by certain nonhemolytic streptococci resulted in a hypersensitive state similar to that which occurs in tuberculosis. They expressed the belief that this hypersensitive, or allergic, state is dependent on the production of focal lesions, and that when the state is once present it can be continued by injection of streptococci that practically do not provoke a reaction in normal animals. An animal that has been highly sensitized responds to intracutaneous injection of very small doses of streptococci, with marked edema, exudation, and proliferation, and to corneal injection it responds with interstitial keratitis; when sufficiently large doses are administered intravenously, it dies.

None of the animals that were first inoculated intravenously, showed the reactions of hypersensitiveness, and the resulting lesions were considerably smaller than those which occurred in normal animals following intracutaneous inoculation. In the majority of their animals, Swift and his co-workers could maintain the hypersensitive state by intracutaneous inoculations which were continued for months; however, intravenous inoculation with appropriate doses abolished the reaction, so that the animal was in the nonsensitive, or immune, state. The prolongation of the hypersensitive state by focal lesions appeared

to be distinctive of the nonhemolytic streptococci, for repeated intracutaneous inoculations of hemolytic streptococci brought on decreasingly intense reactions. There was no apparent specificity of nonhemolytic streptococci in hypersensitive animals.

These observations which seem to demonstrate an allergic and an immune type of reaction toward the same nonhemolytic streptococcus are of significance, and Swift applied these phenomena to the well known differences existing between rheumatic fever and subacute bacterial endocarditis. In rheumatic fever, focal infection is frequently conceded to exist, and there is a marked tissue reaction to certain irritants, which, if they are streptococci, are present in only small amounts in any one region.

As has been stated, the tissues in subacute bacterial endocarditis fail to respond overactively to the infective organism. The lesions in this disease are embolic and the tissues involved do not react by exudation or by proliferation to the extent observed in rheumatic fever. Swift did not interpret the data in subacute bacterial endocarditis as indicative of failure of the tissues to react to the infection, but rather to a reaction characterized by diffuse hyperplasia of the hematopoietic system, and to the embolic lesions.

In defense of the allergic theory of rheumatic fever he stated that, although the part played by streptococci in causation is not irrevocably established, it offers the best available explanation of how different strains of the organism could produce analogous clinical and histopathologic effects.

Rheumatic carditis has frequently been observed following chorea, and this established chorea as being closely related to rheumatic fever.

The lesions of rheumatic fever are exudative and proliferative. There is a reaction of the tissues to areas of focal necrosis which in many instances is extremely minute. Following this destruction of tissue, exudation of fluid and of cells occurs; it is exemplified very well in periarticular accumulations. The fluid contains fibrin, many polymorphonuclear neutrophils, and, often, wandering cells. Similar exudates are found in lesions of the endocardium of the left auricle, the aorta, and smaller arteries.

Frequently, marked increase in the fixed tissue cells occurs and forms the basis of Aschoff's

nodules and the subcutaneous nodules; the latter appear to take their origin from the perivascular spaces. This proliferative tissue reaction has been found not only in the heart, but also in the lungs, pleura, and elsewhere. Exudative lesions, of course, are not characteristic of rheumatic fever, but the degree of exudation surpasses that of most other diseases.

It is interesting, after appreciating certain clinical features of rheumatic fever and its pathogenesis, to compare it with tuberculosis. While the etiology of the two diseases is, of course, dissimilar, many features cause them to present strikingly similar manifestations. They are both pathologically characterized by a focal lesion with a central area of necrosis, the tubercle on the one hand and the Aschoff nodule on the other. In both diseases, exudative and proliferative tissue responses occur. Both diseases are unusually chronic in their course although acute exacerbations are not unusual. In both rheumatic fever and tuberculosis, evidences of allergic reactions have been indicated.

With these parallelisms in mind there seems no reason why many of the accepted doctrines regarding the treatment of tuberculosis should not be emphatically applied to the treatment of rheumatic fever and its sequelæ. I mean, particularly, long periods of complete rest.

Death as a result of acute rheumatic carditis is not common, as is evidenced by the small series of cases reviewed by Thayer and others. However, the eventual toll from cardiac failure is enormous. Few studies have been made which may be said to represent the life cycle of the disease. A few years ago I published the results of a study which comprised 160 patients regarding whom I had reliable data as to the onset of rheumatic fever or chorea and the date and actual knowledge of death from cardiac disease. All these patients presented striking evidence of rheumatic carditis at the time of examination.

The cases were divided into three groups according to the type of lesion found clinically: (1) those with mitral involvement, 124; (2) those with aortic involvement, twenty-one, and (3) those with both mitral and aortic involvement, fifteen. The incidence by sex was equal.

In the group in which there was involvement of the mitral valve, the average age at which the first attack of rheumatic fever occurred, and the presumable time at which the first attack of

rheumatic fever occurred and that at which the heart became involved, was twenty-one years. The earliest age at which the infection occurred was seven years. The average duration of life in this group was only twenty-one years after the first attack of rheumatic fever; the average age at death was forty-two years. Even the maximal age limit was well less than the anticipated normal average.

The statistics for the group with aortic involvement were similar. The average age at which the first attack of rheumatic fever occurred was twenty-one years. The youngest patient at the time of the acute infection was aged seven years. The average expectation of life was, as in the group with involvement of the mitral valve, only twenty-one years after the initial attack of rheumatic fever; the average age at death was forty-three years.

In the third group, made up of those patients with both mitral and aortic involvement, the prognosis was considerably less favorable than for those in the other two groups. The average age at which the acute infection occurred was sixteen years; the earliest recorded age was eight years. The average expectation of life was only sixteen years after the first attack of rheumatic fever; death occurred at the average age of thirty-two years. The patient in this group who lived the longest lived forty-nine years.

This study did not show that recurrent rheumatic fever particularly influenced the expectancy of life from the standpoint of carditis, although this probably would not hold true in a larger series of cases. Recurrences occurred most commonly in the first decade of life and were recorded in 55 per cent of the cases. An instance of recurrent rheumatic infection did not occur after the thirtieth year of life.

Comment

Until the etiology of rheumatic fever is established, a certain specific therapeutic agent will not be available. It is doubtful that even with such knowledge, a specific cure would be forthcoming. It is imperative, therefore, that active steps be taken to institute measures that are supported by scientific reason and that may be instrumental in minimizing the incidence of rheumatic fever. Foremost among these measures are enforcement of the doctrines of hygiene and

education of the laity, particularly regarding the care of children.

The eradication of foci of infection is important, although no one would venture to offer such a procedure as a positive measure of prevention. The removal of infected tonsils is unquestionably indicated, although rheumatic fever occurs in cases in which tonsillectomy has been performed successfully and in which other foci of infection have not been demonstrable. It is difficult to obtain reliable data on the influence of removal of foci of infection as a preventive measure, for in a large series many cases will occur in which removal has been incomplete.

One of the most important measures to be advocated in the treatment of rheumatic fever is a sufficiently long period of rest in bed. If carditis is present or is suspected, the period of rest should occupy months and not weeks.

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OBLITERATING ARTERIAL DISEASE*

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AS an involution process, arteriosclerosis is natural with old age, and is the expression of the natural wear and tear to which the arterial tubes are subjected during the stress and strain of life. Longevity is a vascular question, which has been well expressed in the axiom that "a man is only as old as his arteries." To a majority of men, death comes primarily or secondarily through this portal.

The development of arteriosclerosis is influenced by heredity, infections, alcohol, lead, the toxins of disturbed metabolism, etc. There are men in the fifth decade of life who have never had any special disease, who have eaten and drunk with discretion, in whom arteriosclerosis seems to come on as a direct result of a high pressure life.

Peripheral arteriosclerosis affects the lower extremities more frequently and more severely than the upper, owing to the greater strain upon the vessels because of the upright position and because of poorer collateral circulation. There is a deposit of newly formed connective tissue in the blood vessel walls probably due to some irritative reaction. The connective tissue thickening of the arteries may extend to a degree which will cause symptoms from inadequate blood supply to the parts before calcification has devel-

oped. Calcification alone does not produce obstruction; some of the most extensive cases of gangrene occur when no calcification can be demonstrated. The calcium deposits in the blood vessel wall may project through the inner coat and serve as an object for the deposit of platelets with the formation of an obstructing thrombus. Proliferation of the intima may cause total closure of the small arteries. Total closure of the larger arteries probably never occurs from proliferation of the intima in itself; thrombosis is necessary for occlusion. The veins also sclerose in the arteriosclerotic process.

Among the early symptoms of arteriosclerosis of the lower extremities are numbness, a burning sensation, a feeling of weakness in the feet while walking which disappears on resting, and coldness of the feet. Later, there will be pain after the patient has walked a short distance. Occasionally the pain may be referred to as lightning pain in the calf of the leg. When the arteries of the leg are obstructing the arterial flow to a still greater degree, intermittent claudication will be nature's call for more blood to the part. This is a severe cramping pain of such intensity as to compel the patient to stand or sit down and rest for a time before he can resume his walking. As the disease advances, there may be a shooting, boring pain while at rest. This pain resembles neuritis and may involve the entire ex-

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tremity or only certain areas, as the distal part of the foot. Often it is most marked around the nail bed of the great toe. If the patient has in addition an ingrowing toe nail and operative treatment is undertaken, it may precipitate infection and gangrene due to insufficient blood supply. It is very important to determine that there is sufficient arterial circulation in an extremity before any minor surgical operation is undertaken.

Careful examination of the extremities will often yield important information and should be carried out in detail with the patient's clothing removed. Early diagnosis of incipient cases is important as they offer the best opportunity for successful therapy.

Among the objective findings to be looked for are muscular atrophy due to impaired circulation and restricted activity due to the discomfort of prolonged walking. Roentgenograms may visualize bone atrophy. Trophic disturbances may be seen in the later stages as a thin, dry atrophied skin. The toe nails will lose their normal pinkish color and become dry, brittle, deformed and slow in growth.

Attention to color changes of the extremities will result in the recognition of a larger number of cases of peripheral arterial disease. In moderate degrees of arterial obstruction there may be no appreciable change from the normal pink color of the extremities. In more advanced cases, the foot may be very pale; in others it may be of a dusky red or cyanotic color. In very advanced cases, a deep cyanosis may persist while the patient is in the horizontal position. If such a foot is cold to the touch and the cyanosis does not disappear on pressure, impending gangrene may be anticipated.

Ischemia is a very important sign of arterial insufficiency of the extremities. If the obstruction is insufficient to cause blanching in the horizontal position, the extremities should be elevated to 35 degrees, thus adding the effect of gravity to the arterial obstruction in the production of the ischemia. The appearance of an induced ischemia by the rapid flexion and extension of the feet using the ankle joints as pivots, while the extremities are horizontal, pendent or elevated, is an important diagnostic sign of insufficient circulation. In advanced cases rubor appears after a few seconds of pendency and may extend to the knee. In milder cases it may in-

volve the distal part of the foot or toes only. Rubor is not as important a diagnostic sign as ischemia.

The surface temperature can be fairly accurately determined by palpation with the palm of the hand. The thermocouple determination is, however, more accurate. It may be assumed that the warmth of an extremity is directly proportional to the volume of blood circulating in the part and that cold extremities are due to insufficient circulation.

Assuming that there is no myocardial weakness, the amplitude of the pulsation in the peripheral arteries will give a fair indication as to the patency of the arteries.

Thromboangiitis obliterans (Burger's Disease) should be differentiated from obliterating arteriosclerosis. It is a disease of the arteries of young or middle aged adults interfering with the local flow of blood in segments of the vessels. There is a chronic inflammation of the arteries and veins associated with a thrombosis occluding the lumen and binding the vessels and nerves together. After a variable period of time, other segments of the vessels undergo a similar process. Calcification of the arteries is not a factor but in the early stages vasoconstriction may play a part. The cause is unknown. Most of the patients are heavy cigarette smokers. It is most frequent in Hebrews. About 85 per cent of the patients are males. Migrating phlebitis occurs in about 40 per cent of the cases of thromboangiitis obliterans. It may occur in any part of the foot or leg up to the groin. The final result of the disease depends upon whether or not collateral circulation can be developed fast enough to keep up with the extension of the occlusion by the thrombo-inflammatory process.

Raynaud's disease should not be difficult to differentiate. It is a vasomotor disturbance of the constrictor type. Raynaud based the diagnosis on: (1) attacks of pallor, cyanosis or redness initiated by cold or nervous excitement and relieved by the application of warmth; (2) symmetric bilateral distribution; (3) gangrene which, if present, is superficial and confined to the skin; (4) absence of occlusion of the peripheral arteries. A further criterion is that the patients should have had the disease for at least two years to make certain of its primary nature. Its cause is unknown. The disease usually occurs after puberty and 90 per cent of the patients are

women. These patients are usually of asthenic build, have a small heart, low blood pressure and evidence of vascular deficiency. Most cases are mild and progress slowly without destruction of the skin and finally become stationary or disappear. A few cases progress and cause ulceration of the fingers and toes with occasional destruction of the distal phalanges.

Embolism and thrombosis of the peripheral arteries, for all practical purposes, may be considered together since the effects produced are practically identical. The symptoms develop much more quickly in embolism than in thrombosis. In embolism, the onset is that of a sudden severe pain in an extremity, absence of pulse below the point of obstruction. The extremity is cold and white. The artery or even the whole leg is tender to pressure. If collateral circulation is established, the extremity will gradually return to normal. If collateral circulation is not established or embolectomy promptly performed, gangrene will develop.

There is no specific cure for vascular occlusion of the extremities.

Treatment of obliterating arterial diseases of the lower extremities should consist of maintaining and increasing the diminishing local circulation. When there is much pain present, either while walking or at rest, the patient should be put to bed with the legs in a horizontal position until the pain has disappeared, after which walking may be resumed and gradually increased. Some patients have pain while in bed, probably due to an insufficient flow of blood while the extremities are in the horizontal plane. In such cases, elevating the head of the bed so the feet are a little lower than the body will give relief because gravity increases the flow of blood to the feet. After resuming their usual occupation, these patients should rest as much as possible with their legs in the horizontal position. Samuels² says, "The popular idea that walking improves the circulation does not apply in cases of arterial disease." Focal infections should be eradicated. Infections of the feet should be avoided and carefully treated if present. Trauma and excessive exercise should be avoided. Tobacco, alcohol and highly spiced food should be prohibited. Efforts should be made to treat the pain without the use of opiates. Fluids should be forced. The application of heat is beneficial when there is no gangrene present.

Heat causes a relaxation of vasomotor spasm which usually accompanies organic occlusion of the peripheral vessels. A hot Sitz bath for fifteen minutes once or twice in twenty-four hours with the water at a temperature which feels comfortably hot to the patient is the best method of applying heat. As sensation is often diminished, care must be used in applying external heat by electric bulbs in a cradle, electric pads, infra-red lamps, etc., or the patient will sustain superficial burns which may develop gangrene or infection. Wrapping an extremity in cotton or wool is the safest way of maintaining heat in the extremities. Diathermy is a valuable form of treatment. Burger's postural exercises are helpful. A hot Sitz bath right after the postural exercises seems to increase the beneficial effects of the exercises.

Alternating hot and cold baths using pails high enough so the legs can be immersed almost to the knees are helpful. The immersion in the hot water should be for a longer period than in the cold. As cold is not well tolerated, patients should refrain from swimming or wading in cold water. Protection from cold by wearing high, warm shoes and stockings and living in a warm climate is advisable.

Intravenous injections of 300 c.c. of 2 to 5% solution of sodium chloride every other day appears to benefit some cases. It should not be used if there are cardiac or renal complications.

Of the many drugs used as antispasmodics in the treatment of obliterating arterial diseases, papaverine ranks as high as any.

The intramuscular injection of various tissue extracts have benefited many cases. Schwartzman³ reports excellent results with the use of extract of stripped muscle. An extract of deinsulinized pancreas made by Sharp and Dohme and marketed as Tissue Extract No. 568 has been used with apparent benefit in some cases. The objection to the use of tissue extracts is that the vasodilator action of tissue extracts is brief. This necessitates the giving of several injections a day over a long period of time before beneficial results can be expected.

Intravenous injections of typhoid vaccine beginning with 25 million of the killed bacteria may be given. The dose should be increased by 15 to 25 million at each injection until a good reaction is obtained. A course of ten to twelve injections should be given at weekly intervals, after which

rest for four to six weeks, when the course is repeated. Typhoid vaccine intravenously is contraindicated in the presence of infection, hypertension, myocarditis, and debility.

The use of apparatus for causing intermittent pressure and suction in the treatment of chronic occlusive arterial disease has become somewhat popular. I have not had enough experience with this form of treatment to form an opinion as to its value. I quote the conclusions of Allen and Brown¹ of the Mayo Clinic in a recent paper on the subject: "The intermittent suction and pressure treatment of chronic occlusive arterial diseases increases the skin temperature temporarily, may relieve the pain of ischemic neuritis and trophic changes, and may induce healing of ulcers. It is not clear that these results are superior to those following other methods of treatment. However, it is our impression that the pain of ischemic neuritis is relieved to a greater degree than is ordinarily observed. As a result of our experiences we believe that passive vascular exercise constitutes some, but as yet poorly defined, contribution to the treatment of vascular disease."

When, by the various tests, it can be demonstrated that there is a considerable element of vasoconstriction present, lumbar sympathectomy will increase the flow of blood to the extremities. It is contraindicated in the aged, in the presence of gangrene or extensive ulceration.

In obliterating arteriosclerosis, all of the arteries have a diminished caliber. This reduces the amount of blood going to the part and retards the development of collateral circulation. When diabetes is a complication, the arteriosclerosis progresses more rapidly, making this form of obliterating arterial disease the most difficult to treat successfully. In thromboangiitis obliterans, we are dealing with a younger group of individuals who have a greater ability to resist infection. In this form the obliterating process involves only sections of the arteries, the uninvolvement of arteries retaining their normal caliber which permits the free flow of blood to the vicinity of the obstructing arteries, making the establishment of collateral circulation easy. This is also often the case in embolism and thrombosis. When there is reasonably good circulation to the vicinity of the obstructing vessels, a

good line of demarcation may form, in which case nature will separate the gangrenous parts.

If gangrene develops, the patient should be kept quiet in bed with the extremities in the horizontal position. Elevation reduces the blood flow by gravity. When the leg is in the pendent position, edema develops and impairs the circulation.

When there is a spreading gangrenous process which shows no signs of establishing a line of demarcation, when there is an uncontrollable infection threatening life, or in the presence of unbearable pain, amputation must be resorted to.

To determine the level of amputation, several tests should be made. A level of abrupt temperature change as determined by the hand, clinical skin thermometer or thermocouple, palpation of the main vessels and oscillometer readings are all valuable aids. The intracutaneous salt solution absorption test in which 0.2 cubic centimeters of 0.85 per cent sodium chloride solution is injected at four inch intervals down the limb. Normally the wheal should remain sixty minutes. In circulatory deficiency, the absorption time is reduced markedly. It must be remembered, however, that a well nourished skin may cover non-viable deeper tissues. The intracutaneous histamine flare test gives the same information.

Amputation may be limited to gangrenous toes if the dorsalis pedis or posterior tibial pulses are palpable. If either is not palpable, there should be good circulation as evidenced by a warm foot of good color in all positions, freedom from severe pain, a good salt or histamine test with a reasonably good oscillometric reading, and a good line of demarcation. If these conditions are not present, a higher amputation must be done. If all of the above conditions are present in the mid-leg with a good pulsation in the popliteal artery, a mid-leg amputation may be sufficient. When the above conditions are not present in the leg, a thigh amputation is indicated. In the presence of infection, a circular open amputation is safest.

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OXYGEN THERAPY*

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OXYGEN as a medical aid is familiar to the public as a dramatic element of newspaper headlines, describing the last desperate efforts to save the life of the king, some rich man, or a prominent politician. It is a common instrument in the hands of the fire department, which rushes a pulmotor to the scene in case of a drowning or carbon-monoxide asphyxiation. The public, the officials, and the doctor are all satisfied, even with a report of the subsequent death of the patient, on the theory that since oxygen was used the patient had been given every chance that science could offer him. But the use of oxygen as an adjunct to other methods of treatment in the general practice of medicine is as yet uncommon and unfamiliar to both patient and physician.

History of Clinical Use

The importance of oxygen has long been known in chemistry, but its clinical value was first significantly recognized by Haldane in 1917, when he used it in certain cases of war gas poisoning. In the same year Meltzer, in the United States, found it of value in cases of pneumonia. Barach, in the Presbyterian Hospital in New York, and Boothby, in the Mayo Clinic, demonstrated the clinical value of oxygen by placing the patient in oxygen chambers whenever there was definite evidence of oxygen want in blood and tissues.

Physiology of Oxygenation

Fresh air contains 20 per cent oxygen and 80 per cent nitrogen. In respiration oxygen is taken up by the hemoglobin in the blood, circulating through the capillaries in the alveolar walls of the lungs. The oxygen is then carried to the tissue cells to be used in various metabolic processes. The principal end product of oxidation is carbon dioxide, which in turn is carried back through the blood to the alveolar walls. The percentage of oxygen and carbon dioxide in the alveolar air and in the blood is practically kept in

constant equilibrium. Requirements for normal respiration are:

1. That there be sufficient oxygen in the inspired air.
2. That respiration must be both of sufficient frequency and of depth to introduce enough oxygen into the alveoli.
3. That a sufficient number of alveoli must be open so that oxygen can reach the pulmonary capillaries.
4. That the alveolar walls must be permeable.
5. That there must be enough hemoglobin in the blood, and the hemoglobin must have a normal oxygen carrying power.
6. That there must be an adequate circulation of blood in the lungs and throughout the body to distribute the oxygen to the cells of the body tissue.

Abnormal Oxygenation

Any condition which destroys the normal absorption of oxygen in the lungs, any condition which reduces the circulation of oxygen throughout the body, any condition which causes a stagnation of circulation in the tissues, results in a depletion of oxygen and an increase of carbon dioxide in the cells of the body. This condition in itself produces a disturbance of the physiological functions of the organs, independent and in addition to any pathological process from which the body may be suffering. Such a status produces a strain on the body which in itself may be more serious than the disease.

There are three conditions which produce an increased demand for oxygen.

1. Sudden ascent to a high altitude.
2. Violent exercise.
3. Certain diseases.

All of these cause an increase in heart action and in respiration. In healthy normal individuals there is a normal reserve power with which to meet this demand. Beyond a given point the demand exceeds the capacity for response and the symptoms of oxygen want begin to exhibit themselves. The faster the heart beats the less time there is for rest and recovery between contrac-

*Read at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 4, 1936.

tions. As the energy of the body is dissipated the reserve capacity is lessened, and the ultimate effect is exhaustion.

Oxygen Want

The following symptoms may be enumerated:

1. Mental disturbances, such as headache, anxiety, impaired understanding, and delirium.
2. Air hunger.
3. Pain in the chest.
4. Vomiting.

The objective evidences of lack of oxygen are:

1. Respiratory disturbance evidenced by yawning, irregularity, stertorous, depressed or periodically arrested breathing.
2. Rapid, irregular pulse ultimately becoming slow.
3. Muscle-twitching or convulsive movements.
4. Dilated pupils.
5. Cyanosis.

It should be emphasized that cyanosis is one of the late signs indicative of oxygen need. While waiting for cyanosis to appear, it is a common experience not to recognize the earlier symptoms.

Physiology of Oxygen Therapy

There is only one factor in the respiratory problem which remains constant, that is, the available oxygen in the air in a normally ventilated room. All other factors are subject to change in the presence of disease. Two of these are compensating factors up to a given reserve point. The heart may increase in rate to circulate the available oxygen. The respiratory rate may be speeded up to draw in more oxygen. However, the vital capacity of the lungs may either remain the same or actually be reduced, as in the case of consolidation of the lung in pneumonia or in pulmonary edema. The more rapid the heart rate, the weaker the beat becomes. The more rapid the respiration, the more shallow it becomes. All of this leads to fatigue. The simple and logical way to break this vicious circle is to increase the oxygen concentration in the inspired air. This will permit a reduction in both the heart rate and in the respiratory rate. It will reduce fatigue and save the circulatory reserve power for the important task of meeting the increased demand of combating the disease. By practical experience it has been found best to raise the oxygen concentration to between 50 and

60 per cent. To accomplish this requires a flow of between four to six liters of oxygen per minute, regardless of what type of apparatus is used. The simplest clinical guide for the indication of a satisfactory amount of oxygen is the pulse rate. When the high pulse rate drops to a better level approaching normal, then the oxygen concentration should be maintained as satisfactory.

Medical Indications for the Use of Oxygen

1. *Lung Conditions.*—These include pneumonia, massive collapse, pulmonary edema, pulmonary emboli, atelectasis, simple cyanosis of the new born, and premature infants. In these conditions the capacity of the lung to absorb oxygen is reduced. In proportion to the reduction in the vital capacity of the lung, there is a failure of oxygen throughout the body. The associated toxemia of the heart muscle reduces the compensatory mechanism of circulation. The vicious circle increases, and the symptoms of oxygen want may soon be so aggravated that they may overshadow the original pathology and become the deciding factor in the death or recovery of the patient. If more oxygen is made available, the oxygen want may be overcome in spite of the restricted capacity of the lung; as more oxygen reaches the tissues there is less demand on the heart and on respiration. This permits a slowing of the heart rate, and a corresponding conservation of the reserve strength of the cardiac muscle. Greater comfort is obtained by making breathing easier, and this permits rest and sleep. In the presence of a self-limited disease this conservation of the heart brings the patient through the crisis, or prolongs life until the immunity mechanism is given a chance to conquer the infection. The failure to recognize the symptoms of oxygen want, and the failure to utilize the simple means of supplying the necessary oxygen is a serious neglect in the light of present knowledge.

2. *Heart Disease.*—The addition of oxygen therapy is particularly valuable in cases of advanced decompensation. Coronary thrombosis, and myocardial insufficiency reduce the capacity of the heart to maintain general circulation. A corresponding reduction in the distribution of oxygen to the tissues results. This sets up an increased demand for cardiac effort, forcing a

response of increased heart rate. The fatigue thereby induced weakens the beat and a vicious circle is created. The addition of oxygen therapy lessens the demand and permits the heart to beat more slowly, affording it an opportunity to recover from the acute disturbance. The addition of oxygen in assisting to reestablish a more normal circulation increases diuresis, and as the edema is reduced, an added burden on the cardiac muscle is removed.

Oxygen therapy should therefore be kept in mind in the treatment of cardiacs who show evidence of oxygen want, and who do not respond promptly to the usual measures.

3. *Toxemias*.—Carbon monoxide in cases of poisoning combines directly with the hemoglobin, and in direct proportion to the amount present in the red blood cells it destroys the oxygen carrying power of the blood. A generalized toxemia is produced and the symptoms of oxygen want become evident. Relief by addition of oxygen therapy should be prompt and continuous, until the toxic products have been completely eliminated.

The use of oxygen in the presence of post-operative thyrotoxic crisis is of proven value in slowing the heart rate and maintaining equilibrium until the temporary disturbance is past. The value of oxygen in convulsive eclampsia has been of striking benefit in eliminating cyanosis, combating pulmonary edema, and assisting the heart through the temporary crises.

Other pathological conditions in which oxygen therapy is of value fall under one of three classes already described, pulmonary, cardiac, and toxemic complications. The indications and the results are the same.

Smallpox Vaccine (From Chick Chorio-Allantoic Membrane)—Lilly

The Council on Pharmacy and Chemistry reports that Eli Lilly & Co. requested consideration of its smallpox vaccine made by using chick chorio-allantoic membrane instead of the usual calf lymph. The firm holds that its method of preparation eliminates the hazard of bacterial contamination and gives an improved preparation of uniform potency, diminished virulence and immunizing quality at least as high as that of the vaccine prepared from calf lymph. In support of the claim of equal potency with that of calf lymph the

Methods of Administering Oxygen

The available methods of administering oxygen are:

1. The oxygen chamber or room.
2. Oxygen tents.
3. The nasal catheter.
4. The open mask.

The oxygen room is too expensive to build or to operate to be practical, costing about \$1,000 for a portable room and up to \$4,000 for a permanent room. With the exception of the cost, it is an ideal method.

The oxygen tent is satisfactory for the average hospital, costing about \$300 and supplying any amount of oxygen concentration required. Occasionally a patient may object to being confined in the tent, but a short release soon convinces him of the greater comfort within.

In the use of the nasal catheter method, a very economical and satisfactory portable system is available to any patient. It is important that the tip of the catheter be kept exactly at the level of the lower end of the uvula and fixed at this point to permit the flow of oxygen to be inspired into the lungs. It is also necessary to pass the oxygen through a special humidifier to prevent irritation to the posterior pharynx. A gauge to determine the rate of flow completes the required apparatus under this system.

The open mask method is not satisfactory, but it has some value in emergencies for a short time treatment.

Conclusions

Oxygen therapy has a definite place in modern medicine.

It is strictly an adjunct to other treatment.

Its indications are easily understood.

The methods of its use are simple.

It should be used more generally.

firm presented comparative charts of potencies of the finished produce as filled into the capillary tubes and placed on the market. As evidence for the clinical effectiveness of the product, the firm presented reports of its use by Drs. Frank D. Ryder and Carl J. Lund of Minnesota. The Council considered the submitted evidence favorable but insufficient as yet to justify the acceptance of Smallpox Vaccine (from Chick Chorio-Allantoic Membrane)—Lilly for inclusion in New and Unofficial Remedies. The Council, therefore, postponed consideration of the product to await the development of further confirmatory evidence of its value. (J. A. M. A., September 19, 1936, p. 967.)

THE MANAGEMENT OF THE MINOR AILMENTS OF PREGNANCY*

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THE disorders to be discussed in this paper are met with very frequently in the experience of any doctor practicing obstetrics. They are not matters of life and death. They seldom incapacitate the patient. Sometimes the physician must even elicit the complaint; yet in the daily economy of life of the pregnant woman they are very important and distressing, and only too frequently not given the care that they deserve by the medical advisor.

Some of the problems are not purely obstetrical and for that reason are largely neglected in the obstetrical literature. But one must be alert to their importance during the gravid state in order to manage them intelligently. As a basis for a statistical estimate of the frequency of these complications, data has been collected from one hundred consecutive cases in private practice. The results will be indicated in connection with the various complaints.

Vaginal Discharge.—Vaginal discharge during pregnancy is troublesome to about half of all gravidas. In general there are four main causes. The pelvic congestion attending pregnancy often increases the secretory activity of the cervical glands, particularly in the presence of a mild, nonspecific endocervicitis. Cautery of the cervix which is such an excellent measure in the non-gravid state has been suggested as treatment, even during pregnancy, but seems rather hazardous. The cervix in this instance is better left alone or treated conservatively with 10 per cent silver nitrate. The treatment of gonorrhea in pregnancy requires no special discussion here. Trichomonas vaginitis may be treated in any of the approved manners. We have found a 5 per cent mixture of quinine sulphate in kaolin blown into the vagina to be as satisfactory as anything. The fourth cause of vaginal discharge during pregnancy merits special comment.

A vaginitis caused by monilia of the yeast family is met with not infrequently in any gynecological practice. During pregnancy the incidence is from two to three times as great. The

clinical symptoms are burning and itching of the vulva associated with a rather profuse yellow vaginal discharge. The appearance of the vulva is red and irritated with occasional ulceration around the hymenal ring. The walls of the vagina are hyperemic and covered by material having the appearance of yellow cottage cheese. There frequently is slight bleeding upon wiping the discharge from the mucosa. The gross appearance to the trained eye is practically diagnostic, but the microscope is a distinct aid. On a stained smear the organism is gram positive and one sees the long strands of mycelia with the buds projecting from the sides.

This infection may cause very marked discomfort for the patient and not infrequently for the doctor as well. It is very refractive to nearly all forms of treatment except the application of gentian violet. This drug is best used in 1 per cent aqueous solution applied topically to the vaginal walls after the discharge has been wiped away. A cure results promptly in the majority of cases in from one to four treatments, but recurrences two to three weeks later are very common until the end of the pregnancy. I have found in a few cases that the accompanying ulceration has failed to respond to anything but administration of vitamin B complex in the form of brewer's yeast and have the feeling as yet unverified that a deficiency of this accessory food factor may definitely favor moniliasis. It is generally accepted that vitamin B and G requirements during pregnancy are two to three times normal so that relative deficiencies would likely be more frequent at this time.

Backache.—Pains in the sacro-iliac and lumbosacral regions constitute one of the most common and troublesome complaints of pregnancy and the few months following delivery. In this series of one hundred women, thirty-two had moderate and twelve had severe low backpain during pregnancy, a total of forty-four. The same complaint was even more prevalent in the few months following pregnancy with twenty-nine moderate and twenty-two severe, a total of fifty-one.

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The wide female pelvis whose architecture was evidently never designed for bearing as much weight as assumption of the erect posture has placed upon it, greatly favors sprains of the sacro-iliac joints. The general pelvic congestion incident to pregnancy softens the ligaments maintaining the pelvic bones in apposition. The hormone, relaxin, which Hisaw in 1929 isolated from the corpus luteum appears to have the specific function of relaxing the ligaments surrounding the pelvic synchondroses. The use of high heels and the forward pull of the large abdomen are exciting factors because they tend to exaggerate the lumbar curve. All motions of stooping and lifting put great strain on these joints. Obesity increases the hazard. These forces during pregnancy so weaken or sprain the posterior pelvic joints that the necessary frequent lifting of the baby and stooping incident to its care, not only prevent healing, but greatly aggravate the condition, resulting in chronic sprains which are too often incapacitating because of their severity. I routinely warn my patients of the danger of low back sprain and caution them against all lifting during pregnancy. The use of a properly fitting maternity girdle designed to bind the pelvis and prevent increased lumbar lordosis is an excellent prophylactic measure.

Treatment of the condition when it has once become established includes first and foremost avoidance of the particular trauma which has precipitated the trouble, namely, stooping and lifting. Hot packs to the back and use of a girdle are advisable and such simple advice as changing the baby's diapers and bathing it on a table high enough to make stooping unnecessary, and early training of the child to get into bed and onto the toilet by itself, make for less unavoidable strain on the back joints, permitting them to recover more readily.

Low Abdominal Pains.—After a differential diagnosis of low abdominal pain has ruled out appendicitis, cystitis, ureteral colic and many other definite entities, there still remains a large group of pregnant women who suffer from unilateral or bilateral low anterior abdominal pains. Some of these are referred from sprains of the sacro-iliac joints and are improved by proper support of the pelvic girdle. Many disappear when a previous calcium deficiency is overcome.

Still others persist in spite of treatment. As a general rule it is very worth-while to explain to the patient that she is not suffering from appendicitis (for that is usually her diagnosis) or any serious disorder, but that the pains are common in her state and are due to pressure and stretching of the uterus and its supports as enlargement is taking place. Such a simple explanation puts her mind at rest and is often a very good adjunct to other therapeutic agents in relieving this symptom.

Leg Pains and Cramps.—The incidence of these uncomfortable symptoms in this series was 40 per cent, including 13 per cent severe. The causes are mainly two in number: (1) relative anoxemia of the muscles resulting from poor circulation due in turn to pressure on the veins draining the lower extremities; (2) hypocalcemia. This complaint can be relieved by prescribing an adequate calcium ration and by elevation of the foot of the bed slightly at night to aid venous return. During the day it is well for the patient to rest with the feet elevated at least as high as the hips, rather than with the feet on the floor.

Inasmuch as the requirements of the anti-neuritic vitamin B are increased during pregnancy, the idea presents itself that many of the pains experience during the gravid state are neuritic in origin due to deficiency of this specific substance. I am employing brewer's yeast at present in an effort to combat those pains not controlled by the above treatment, but have no definite data as yet.

Teeth.—The old saying "a tooth for every child" is still too much with us. General dental health is poor enough at best. In pregnancy the tendency to caries and other dental disorders is enhanced to the extent that 36 per cent of this series reported definite increase in incidence of cavities. All of these women had private practice prenatal care. We know that tooth conditions in under-privileged groups are much worse. The heavy demands for calcium made upon the maternal organism by the fetus partly explains the difference. Dietary restrictions imposed upon the mother by hearsay and superstition contribute to this state of affairs. A general routine aimed at dental prophylaxis during pregnancy should include preferably three visits to the dentist during the nine gravid months and two dur-

ing the period of lactation. The present emphasis on the importance of vitamin C in tooth and gum health points to a tumbler full of orange juice daily as the minimum adequate vitamin C ration. The recent commercial availability of crystalline vitamin C or cevitamic acid suggests its use where fruits are contraindicated or not well borne. Vitamin D (and incidently vitamin A) requirements are met by daily administration of two tablespoonsful of U.S.P. cod liver oil or its vitamin equivalent in concentrates or substitutes.

Obtaining an adequate daily calcium ration is often a very poorly met problem. The normal requirement in the non-gravid state is stated by different workers to be between one-half and one gram of elemental calcium daily. The fetus uses varying amounts of this mineral, actually needing nearly a gram per day during the last two months. The average diet exclusive of milk contains about .4 gram of calcium daily. To be thoroughly on the safe side and aim at 1.5 to 2 grams daily in the maternal diet, one must prescribe in addition three pints of milk daily, or calcium lactate to the extent of 12 grams (three teaspoonsful) daily; or calcium gluconate in amounts of 17 grams (one well-rounded tablespoonful) daily; or dicalcium phosphate to a total of 8 grams (two well-rounded teaspoonsful) daily. These amounts may seem at first glance to be excessive. However, it is not generally appreciated that calcium gluconate contains only 9 per cent calcium, the lactate 12 per cent calcium, the dicalcium phosphate about 25 per cent calcium and milk 1 gram per quart. Actually, milk contains more calcium than lime water. The great prevalence of symptoms referable to low blood and tissue calcium content which one sees with the ordinary small calcium ration prescribed makes it seem that we often err on the side of conservatism in dosage. The details of dietary requirements mentioned here in connection with the teeth applies equally to the problem of leg cramps, low abdominal pains and even somewhat to the toxemias.

Anemia.—Anemia during pregnancy is classified according to whether it is hyperchronic and macrocytic, or hypochromic and microcytic.

Of those gravidas with a hemoglobin below 45 per cent, about one-sixth have the macrocytic type. This group carries a mortality of 65 per

cent if untreated. Management is the same as for Addisonian pernicious anemia with liver the specific therapeutic agent.

The microcytic anemias met with in pregnancy usually respond to large doses of iron. Those cases which do not progress favorably with iron alone are usually associated with a gastric achlorhydria and do well if hydrochloric acid is prescribed in addition. Routine hemoglobin determinations are as essential to adequate prenatal care as urinalysis, weight and blood pressure determinations. It is well to recommend meat once daily to the expectant mother for otherwise she often follows the advice of friends and denies herself the iron and other hematopoietic factors in this food.

Pyelitis.—In passing, I might just mention that results in our hands with the use of methanemine given by vein are far superior to the usual oral medications; and also the use of the ketogenic diet has proved quite satisfactory in this condition, provided of course that there is no anatomically defective drainage of urine.

Varicosities of the Vulva.—These are occasionally encountered during pregnancy and may be associated with marked discomfort. This is relieved by the use of a vulval pad, fastened in front and back by heavy elastic to a girdle so that constant pressure against the perineum is maintained.

Pyrosis.—Heartburn in the last trimester was present in over a third of this series and severe in 15 per cent. This condition probably results from the mechanical encroachment of the uterus upon the confines of the upper abdomen and interference with adequate biliary drainage and emptying of the stomach. One finds on careful questioning that it is usually associated with the ingestion of fatty foods. Elimination of butter, cream, and ice cream as well as fat meat and nuts from the diet relieves the condition considerably and symptomatic relief from soda or other alkalies usually solves the remainder of the problem. Occasionally mild sedation is of value.

Constipation.—The universal complaint of constipation is accentuated during pregnancy. The ideal treatment of course would include no drugs at all, but would place great emphasis on a regular habit time shortly after a meal to take advantage of the gastro-colic reflex. The inges-

tion of a daily total of at least two cupsful of those five per cent vegetables which contain much indigestible cellulose, and two glasses of water half an hour before each meal in addition to the liquids at meal times are also of great value. Plenty of walking helps. All laxatives have disadvantages. They seldom are more than temporarily palliative. Any strong purgative may stimulate the smooth muscle of the uterus as well as the bowel. The continued use of magnesium compounds is contraindicated because of the fact that the ingested magnesium tends to mobilize and bring about excretion of increased amounts of calcium, which is at a premium during pregnancy. Mineral oil and those preparations containing it and agar agar in addition represent probably the best medicinal agents. It must be borne in mind, however, that the vitamins A and D so precious during pregnancy are oil soluble and it has been demonstrated that they may be carried out with the mineral oil. For that reason the vitamins should be administered as far removed as possible in point of time from the mineral oil. Adequate management of constipation of course materially decreases the incidence of hemorrhoids and other related complications. In this series constipation was moderate in twenty-eight and severe in twelve, a total of forty in 100 cases.

Vomiting of Early Pregnancy.—This symptom occurred in 47 per cent of the series including 15 per cent severe. There are only two phases of its management that I wish to mention. The tendency has been to regard this condition largely as a neurosis. We are becoming aware that glandular dysfunctions frequently lay the groundwork for nervous disorders. We know that the withdrawal of the follicular hormone at the menopause is associated with marked nervous hyperactivity. It has been demonstrated that

this important leavener of the nervous system is often decreased in the early months of pregnancy. Actually it is observed that administration of follicular hormone frequently controls this vomiting. Dosage will vary from 100 to 250 rat units at three to six day intervals.

A warning should again be sounded of the grave danger attending hyperemesis gravidarum in the resulting avitaminosis, particularly of vitamins B and C and every effort should be made to provide these important factors.

Early Toxemia.—The signs of early toxemia such as a moderate elevation in blood pressure, edema and too rapid weight gain, and moderate albuminuria, appear very frequently in the last trimester. Statistically this complication occurs with less frequency in those women who are already receiving adequate calcium and vitamin D. They are almost always influenced somewhat favorably by addition of calcium and vitamin D to a previously deficient diet. The large majority of these patients improve readily if placed upon a regimen including rigid restriction of fluid intake to one quart daily, drastic reduction of sodium chloride intake, mild sedation and a daily cocktail of half a glass of water with one level tablespoon of magnesium sulphate to favor elimination of water as well as wastes from the bowl. Those who do not respond to this general form of treatment should be observed very closely lest they become more toxic and require prophylactic premature induction of labor.

Summary

A few of the common minor ailments of pregnancy have been discussed with suggestions for their management. Data from one hundred pregnancies in private practice have been tabulated to give an idea of the relative incidence of these disorders.

SYMPTOMS AND SIGNS WHICH MAY MAKE POSSIBLE THE EARLIER RECOGNITION OF CARCINOMA OF THE STOMACH*

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WE are reminded constantly of the fact that within the scope of our present knowledge the only solution to the problem of successful treatment of carcinoma of the stomach lies in earlier diagnosis and in earlier surgical eradication of the disease. But how is earlier diagnosis to be made? This question is particularly pertinent in light of the statement in a recent book on the stomach and duodenum that, "It cannot be too strongly emphasized that it is extremely difficult for even the most able clinician to make an early diagnosis of carcinoma of the stomach."

It is quite clear that the competent roentgenologist, of all physicians, is the one most likely to be able to make a diagnosis of this disease in its earliest stages. But the physician who uses roentgenologic methods for diagnostic purposes cannot make an early diagnosis unless he examines patients in whom there is frequently no more than a suspicion of the presence of the disease. Consequently, it is up to us practitioners to be on the alert for those signs and symptoms which will make us suspicious of the possibility of gastric malignancy and to advise and insist on careful roentgenologic examination when such symptoms occur. If we will depend more on suspicion and less on definite diagnostic features in our demands for roentgenologic study, the diagnosis of early carcinoma of the stomach will be made more frequently; if on the other hand we wait until we can make a definite diagnosis by clinical means, the lesion will more often than not prove to be inoperable.

There is no characteristic clinical history of early malignant disease of the stomach. In fact, patients with extensive lesions not infrequently present a variety of clinical syndromes. This is because symptoms depend principally on the pathologic type and situation of the lesion, and to some extent on the reactivity of the individual (whether he is hypersensitive or hyposensitive). Lesions near the pylorus are more likely to lead

to obstruction, whereas those high in the fundus of the stomach will more often produce anemia, loss of weight and strength, and vague dyspepsia.

I should like to emphasize particularly that to be suspicious of the presence of gastric carcinoma in the patient who sits before him, the physician does not need elaborate laboratory equipment—he needs use only his clinical judgment and ability. If he will give consideration to the history, the appearance of the patient, and the results of physical examination, particularly the first, the history, then he will have made the first step leading to early diagnosis of the disease. Only occasionally will these signs fail him and the ordinary procedures of gastric analysis, blood count, and studies of occult blood in the stool alone lead him to suspect the possibility of this disease.

History

In cases of disturbances of gastro-intestinal function the history is the most important diagnostic feature. It is the occurrence of symptoms which leads the patient to the physician; the character of the history leads the physician to suspect disease or an abnormality in function of the digestive tract, and it should lead in many cases to careful roentgenologic examination.

Carcinoma of the stomach, in the early symptoms it produces, may mimic a variety of diseases. The patient may give a history in which the outstanding feature is a so-called typical dyspepsia or the dyspepsia may be like that of peptic ulcer; on the other hand anemia, symptoms of pyloric obstruction, or a general decline in health or nutritional disturbances may be the significant factors.

The so-called "typical" history of this disease is, unfortunately, too commonly emphasized; I say "unfortunately" because so often when the symptoms are clear cut the disease is already hopelessly advanced. The characteristics of this typical history are as follows: The patient, usually middle-aged, says that he has had per-

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota. Read before the meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 4, 1936.

fect digestion until the gradual or rapid onset of dyspepsia, characterized by anorexia, fullness and discomfort after meals, belching, burning and nausea, and occasionally vomiting with loss of weight and strength. The story is usually of a progressive condition; but only one instead of all of these symptoms may be present. Not infrequently the patient is emaciated and is aware of the presence of an abdominal mass before he consults his physician. It is interesting to note how frequently these symptoms begin following an apparently acute infection accompanied by loss of weight—"flu" or "intestinal flu," as the patient so often describes it.

It is particularly important to emphasize that carcinoma of the stomach not infrequently leads to dyspepsia which so closely simulates that of peptic ulcer that the physician makes the latter diagnosis and occasionally feels so sure of it that he omits roentgenologic studies. The history of an ulcer-type of distress may be of long or short duration. If the patient is of middle age or beyond and gives a history of distress of short duration, or if he has for many years had an ulcer type of dyspepsia which has subsequently changed gradually but significantly, the physician should be suspicious of malignant disease. His suspicions will be further aroused if associated with this dyspepsia there is loss of weight and strength out of proportion to the reduction in the intake of food.

Anemia is one of the commonest findings in cases of malignant disease. Anemia, which may be the first and presenting symptom in gastric carcinoma, usually depends on the presence of an ulcerating or polypoid lesion. If the lesion is in such a position in the stomach as not to interfere with its emptying, anemia may be present before any other symptom develops. Since the anemia depends principally on oozing from areas of necrosis and sloughing of small vessels, it usually develops gradually and without noticeable loss of blood. Consequently, if a patient presents symptoms of anemia the cause of which is not obvious, the suspicion of oozing from a lesion in the digestive tract, particularly from a malignant lesion in the stomach or cecum, should be entertained.

Patients who present themselves because of a general decline in health, unexplained fatigue, or because of loss of weight and strength not in-

frequently have malignant disease in the stomach even though gastro-intestinal symptoms are absent. Anorexia may be the only symptom; or pallor and weakness alone may be present. It is important to recall that carcinoma of the stomach may develop in the presence of any chronic disease. When carcinoma of the stomach produces a general decline in health and strength without producing significant digestive disturbances, the lesion is most frequently situated in the fundus or cardiac portion of the stomach. When symptoms of pyloric obstruction or gastric retention develop suddenly or even gradually after an illness of short duration, the possibility of carcinoma of the stomach must be kept in mind. Such lesions practically always involve the pyloric end of the stomach and therefore offer some prospect of resection if not too extensive.

The importance of an adequately taken history in arousing suspicion of gastric carcinoma cannot be overstated. Particular consideration must be given to anorexia or dyspepsia which develops for the first time in an individual past forty years and which persists for more than two weeks. Although in most such cases the disturbance is the result of fatigue, nervous upsets, anxiety, worry, disease in the gallbladder, duodenum or colon, or occurs from dietary indiscretion, nevertheless it is wise to consider the possibility of a gastric neoplasm and to advise roentgenologic study, for if one waits for well-recognized guideposts before making the diagnosis and advising roentgenologic studies, it may be too late. Similar consideration must be given also to middle aged individuals who are subject to chronic dyspepsia in whom new symptoms develop or old ones become intensified. In brief, any change in the usual rhythm of the digestive process which persists for a longer time than usual is the principal feature in the history which should make the physician suspicious of carcinoma.

Appearance of the Patient

Sudden unexplained pallor or a pasty color, obvious emaciation or loss of weight, or any change in the patient's appearance from that of previous good health are not of themselves diagnostic of carcinoma, and they may not even lead one to be suspicious of it. But if they lead the physician to further questioning and to a search

for an explanation, they may be the starting point which will lead eventually to recognition of an early gastric lesion.

Physical Examination

It is questionable if any finding other than pallor on physical examination ever leads to the early diagnosis of gastric carcinoma. Emaciation, a palpable mass, or evidence of metastatic involvement of the left supraclavicular node, the rectal shelf, or umbilicus, are late signs; unfortunately all too often a palpable mass means that the lesion has involved the serosa or contiguous organs. The absence of a palpable mass does not signify that the lesion is operable, however, for it may be on the posterior wall or high under the ribs where it cannot be reached by the palpating hand.

Gastric Analysis

While it may be helpful, it is not essential to make an analysis of the gastric content of patients whom one suspects of having carcinoma. Nothing is more deceiving than the belief that the presence of hydrochloric acid is evidence against the existence of carcinoma of the stomach. In more than 50 per cent of cases free hydrochloric acid will be found. Neither does achlorhydria indicate the presence of carcinoma. In the individual case, the diagnostic value of the level of gastric acidity is usually nil. This does not mean that determinations of gastric acidity should be discarded, for the occurrence of gastric retention, as revealed by a large volume of content, the presence of food remnants in the stomach twelve hours after eating, or of much fresh or old blood, should alone or together demand solution by roentgenologic study. The simple Ewald meal consisting of eight plain cookies and two glasses of water, with aspiration an hour later, should give valuable information in regard to these last named features.

Occult Blood in the Stool

Examination of the stool for occult blood when properly performed may be an extremely valuable diagnostic procedure. However, the field of its usefulness is quite limited. Great care must be exercised in performing the test that the patient does not eat any meat for the three preceding days, and if there is bleeding from the gums or from hemorrhoids, errors may

occur. If the test is persistently positive after such precautions have been taken, search should then be made by roentgenologic methods for a lesion in the gastro-intestinal tract. One should not place too much reliance on a negative test as signifying the absence of malignant disease, nor should this test be used to replace roentgenologic methods of study.

Blood Counts

Such a simple procedure as a blood count may frequently lead the physician to suspect carcinoma of the stomach. If unexplained anemia exists, a slowly oozing but otherwise symptomless gastric lesion may be the etiologic factor. Consequently, roentgenologic examination of the stomach is warranted in all such cases. Because of the occasional coincidental occurrence of pernicious anemia and gastric tumors it is wise to advise roentgenologic study of the stomach in all cases of pernicious anemia.

Comment

Unfortunately, in many communities facilities permitting competent roentgenologic examinations of the gastro-intestinal tract are not available. Many laymen are as yet not aware of the necessity of roentgenologic methods of study when dyspepsia is present; nor do they realize the benefits to be derived from such examinations. These factors, along with the cost of such examinations, often lead to procrastination—and procrastination in cases of carcinoma of the stomach leads only too often to an eventual diagnosis of an inoperable lesion. Our only hope for earlier diagnosis of this disease in the future lies in more frequent examinations, by competent roentgenologists, of the stomachs of patients who present no more than a suspicion of the disease. While this will result in many apparently needless examinations, it will also lead to earlier diagnosis in many cases, and therefore to earlier surgical eradication of the disease. At present it is the only solution to the problem of early diagnosis.

Too much emphasis cannot be placed on the necessity for competent roentgenologic examination, for the earlier the stage of development of the lesion, the more difficult it is to visualize and to interpret it. It seems obvious that incomplete or inadequate roentgenologic studies are practically useless under such circumstances. In addi-

tion, if the examination is negative and the signs and symptoms which have aroused suspicion persist, the examination should be repeated after an interval of a few weeks.

In conclusion let me emphasize that in our attempt as practitioners to recognize carcinoma of the stomach in its earlier stages, we must depend principally on signs and symptoms which lead only to a suspicion of the presence of the disease. Our suspicions should be aroused by any patient of middle age or beyond who has in-

digestion which persists for two weeks or more, by any patient who in addition to his usual chronic dyspepsia has an acute exacerbation or change in digestive symptoms, or by any patient who suffers from anemia, fatigue, a decline in health, weight or strength, or who bleeds from the intestinal tract—all without adequate explanation. We must continually be conscious of this disease as we scan the diagnostic horizon of the patient who sits before us. If our suspicions are aroused, then we must *insist* on competent roentgenologic study of the stomach.

THE TREATMENT OF TRICHOMONAS VAGINITIS WITH SILVER PICRATE*

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WHILE vaginitis caused by *Trichomonas vaginalis* has been controlled by several methods of treatment reported by other authors, most of these methods are not well adapted to the particular problem with which we are confronted in this clinic. Patients living in dormitories and engaged in college work find it impossible either to make use of douches or to spare the time required for the frequent clinic attendance which some methods of treatment require. From the standpoint of our staff, also, any method of treatment which reduces the number of visits to the clinic is advantageous.

Twenty patients, including twelve University students, have been treated with silver picrate by the method described here, which has proved very satisfactory from the standpoint of simplicity, efficiency, and economy of time and money. While we do not feel that silver picrate is any more specific for *Trichomonas* than other drugs, there is controlled evidence of its toxicity in low concentration for this group of organisms,⁸ and in our hands the clinical application appears to confirm the laboratory evidence. The fact that a comparatively short course of treatment, usually two weeks, has produced remission of symptoms and negative smears for the five to six months' observation period appears to us to warrant this report of our investigation.

Donne² first called attention to this parasite in 1836, and in the years following it was considered to be a simple ciliated cell. In 1855 Kölliker and Scanzoni⁶ established positive diagnosis of the disease, described the symptoms as we recognize them today and used diluted vaginal secretion for direct microscopic examination. Excellent reviews of the literature on *Trichomonas vaginalis* are those of Bland, Goldstein and Wenrich, and of Jacoby and DerBrucke, which also illustrate the present difference in opinion as to the pathogenicity¹ or non-pathogenicity⁴ of the organism. However, regardless of this point, most writers favor retaining the term "*Trichomonas vaginalis vaginitis*" as a description of a definite entity, directing their treatment toward the elimination of the parasite, and in the past five years the infestation has attracted much attention.

The most outstanding symptom of *Trichomonas vaginitis* is pruritus. The patient complains of a constant vaginal discharge which is pale yellowish-green, sometimes so profuse that a pad must be worn continuously. The discharge is very irritating and produces a diffuse mottling and redness about the introitus, at times with ulceration of the vulva and redness of the adjacent surfaces of the thigh. This leads to itching and burning which interferes with the patient's sleep as well as her work. Pelvic pain

*From the Student Health Service, University of Minnesota, Minneapolis.

and even abdominal pain may be present. The vagina is red and inflamed and very tender. Usually small hemorrhagic spots may be seen. Diagnosis is made by the above symptoms and by finding the organism in a fresh smear, either by the hanging drop method or by placing a drop of normal saline, mixed with the secretion from the vagina, on a slide and covering it with a cover glass, using a little pressure. This Trichomonad has four flagella, with its undulating membrane attached at a point about half way down the body. The movements of the flagella and undulating membrane make identification very simple. The flagellates are harbored in the rugæ of the inflamed and thickened vaginal mucosa and their growth is stimulated by fresh blood, which explains the recurrence of symptoms following a menstrual period. A smear should be taken to exclude gonorrhea.

Many methods of treatment have been used for this condition with variable results, indicating that nothing specific has been found. The patient gets at least temporary relief with almost any of the popular forms of treatment,^{3,5,7} but most of them require daily office visits by the patient over several weeks' time or else daily douches at home. Many of the college students I have treated were unable to take douches because of their living conditions. Most of these are young girls and virgins.

Method of Treatment

The vagina is cleansed with hydrogen peroxide solution, which readily removes the discharge and is non-irritating. The mucosa is then dried and entirely covered with a 1 per cent dispersion of silver picrate in kaolin.* The patient is then directed to insert for six nights a boroglyceride-gelatin suppository containing two grains silver picrate, and then to return for the second insufflation. This is in turn followed by the use of six more suppositories. This constitutes the "routine treatment" referred to in the case histories.

Patients have been re-examined for five or six months and have remained symptom-free. While in most of these cases the preliminary cleansing was carried out, there is some evidence that results are just as satisfactory if this is omitted. In two virgins, it was impossible to

insert even a vaginal speculum because of the small opening and the marked irritation. In these the vagina was swabbed out with hydrogen peroxide, using an applicator, and this was followed by the insufflation of the powder. These two patients cleared up rapidly, but they were both acute and of short duration.

In the majority of cases no Trichomonads could be found and the patient was symptom-free after the first treatment. The smears were again checked in a week, and also immediately following menstruation. If the patient started menstruating during her treatment no change was made in the method of procedure. In cases where any discharge persisted, even if the smears were negative and the patient was otherwise symptom-free, five grams of the picrate powder was again insufflated. As will be noted in the case histories below, satisfactory relief of symptoms and control of the infestation was obtained in all cases.

Case 1.—Miss A. B., aged twenty-one.

History.—Slight leukorrhea since onset of catamenia, seven years ago. Discharge profuse, with pruritus, one week before present examination.

Examination.—Irritation of vaginal wall, associated with profuse discharge. Hanging drop positive for Trichomonas vaginalis.

Treatment.—February 4, 1936. Routine as outlined above. Symptoms disappeared. Following next menstruation there was a slight amount of discharge, which was negative for T. vaginalis. One insufflation was given at this time. One week later there were no symptoms nor discharge. There was no discharge following the next menstrual period and no symptoms have appeared since. Under observation four months.

Case 2.—Miss A. B., aged forty-two.

History.—Supravaginal hysterectomy, January 3, 1936.

Examination.—March 10, 1936. Profuse discharge. Severe pruritus and chafing. Congested and irritated vaginal wall, and profuse discharge which was positive for T. vaginalis.

Treatment.—March 10, 1936, routine. March 17, no symptoms. Negative for T. vaginalis. March 24, patient comfortable but some discharge present. One insufflation given at this time. March 31, smears negative. Vaginal wall appeared normal. April 6, patient in for check-up. April 13, patient in for check-up. April 20, patient in for check-up. May 5, no symptoms.

Case 3.—Mrs. F. B., aged thirty-three.

History.—Two normal pregnancies, five and seven years ago. Discharge with severe pruritus but no chafing, for one month.

Treatment.—January 28, 1936, smears positive. Routine. February 4, smears negative; February 11, after

*For this purpose the Shelanski insufflator has proved the most satisfactory instrument, due to its ballooning effect and simplicity of operation. The insufflator and powder used was supplied through the courtesy of John Wyeth & Brother, Inc., Philadelphia.

menstruation slight discharge with pruritus. One insufflation given. February 18, patient in for check-up. No symptoms. February 25, patient in for check-up. No treatment. Since March 12 smears negative but slight itching at times. Vagina appears normal and discharge very slight. Patient used suppositories during March menstrual period. Has had no symptoms since. Last examined May 5.

Case 4.—Miss C. C., aged twenty-two.

History.—Treated elsewhere two years ago. Says she was given "local treatment," some discharge at intervals with itching.

Examination.—Negative, except slight discharge.

Treatment.—February 11, 1936, vagina cleansed with peroxide solution but no powder used. February 18, after menstruation moderate discharge positive for *Trichomonas vaginalis*. Routine treatment. February 25, negative for *T. vaginalis*. March 17, slight discharge, negative for *T. vaginalis*. Five grams powder insufflated. March 24, smears and symptoms negative. April 14, slight discharge. Negative hanging drop. Five grams powder used. To return for check-up. June 6, returned for recheck before school closed. No symptoms, negative findings.

Case 5.—Miss R. H., aged nineteen.

History.—Discharge and slight chafing for two months.

Examination.—December 5, 1935. At completion of menstruation some pruritus present. Hanging drop positive.

Treatment.—December 5, 1935, routine. December 12, smears negative. January 4, 1936, after menstruation, negative for *T. vaginalis*. February 1, after menstruation, negative for *T. vaginalis*. March 12, slight irritation. Moderate discharge but no *T. vaginalis* could be found. One insufflation given. April 2, negative. May 5, negative.

Case 6.—Miss G. M., aged twenty.

History.—Has been undergoing treatment for two years for severe pruritus and chafing. Relieved only by daily douches of green soap.

Examination.—Smears positive for *T. vaginalis*.

Treatment.—March 24, 1936, routine treatment March 31, smears negative. April 20, had discomfort during menstruation, and used her usual douche on her own initiative. April 25, menstruation completed. Slight bloody discharge from cervix. Smear negative. Additional 5 grams of powder given as prophylactic, and suppositories directed. May 2, negative. June 6, negative. Patient advised to use suppositories if any symptoms during vacation, to be spent at summer camp.

Case 7.—Miss M. P., aged twenty-two.

History.—Patient seen in November, 1934, when profuse discharge from vagina was found to be positive for *T. vaginalis*. Treated at that time with sodium perborate irrigations and quinine insufflations. Quinine treatment daily for ten days produced negative smears, and there was very little discharge following menstruation,

but during December, 1934, symptoms again appeared and treatment was repeated. During 1935 symptoms were controlled by silver picrate suppositories.

Examination.—Seen again November 9, 1935, with profuse discharge, positive for *T. vaginalis*. Routine treatment given. Patient has had no positive smears but there is a moderate amount of irritating discharge. Suppositories of silver picrate are used to control this and the discharge is gradually decreasing. Last seen May 2, 1936, and had used only two suppositories during the preceding month.

Case 8.—Miss I. P., aged twenty.

History.—Discharge and irritation for three days since last menstrual period. Hanging drop positive November 23, 1935.

Treatment.—Routine, starting November 23, 1935. No symptoms after next three menstrual periods.

Case 9. Miss E. S., aged nineteen.

History.—Pruritus and chafing for one week.

Examination.—Moderate discharge, positive for *T. vaginalis*.

Treatment.—Routine, February 6, 1936. Negative after March and April menstruation. Returned for check-up June 6, 1936. No symptoms. Examination negative.

Case 10.—Miss M. T., aged twenty-four.

History.—Slight irritation following two menstrual periods.

Examination.—Moderate discharge, positive for *T. vaginalis* March 14, 1936.

Treatment.—Routine, March 14, 1936. No symptoms since. In for check-up June 6, 1936. No symptoms, examination negative.

Case 11.—Miss R. T., aged twenty-one.

History.—Treatment over two years for recurrent leukorrhea. Severe pruritus and chafing for one month prior to present examination.

Examination.—Irritation of vulva, profuse discharge, positive for *T. vaginalis*.

Treatment.—December 6, 1935, Quinine sulphate insufflation. Results good. January 6, 1936, symptoms returned. Routine treatment with silver picrate powder. March 21, symptom-free until after March menstruation, when slight discharge appeared, which was negative for *T. vaginalis*. Five grams silver picrate kaolin powder given. April 18, after menstruation, no discharge or symptoms. May 15, examination negative. No symptoms.

Case 12.—Miss I. L., aged twenty-two.

History.—Profuse discharge and pruritus for one week.

Examination.—Virginal hymen. Swelling of vulva and profuse vaginal discharge, positive for *T. vaginalis*.

Treatment.—March 14, 1936, routine without using speculum. March 21, very little irritation. Negative hanging drop. March 28, smears negative for *T. vaginalis*. Very little discharge and irritation. April 4, after

menstruation discharge moderate, negative for *Trichomonas*. One insufflation of powder given. April 11, slight increase in discharge and pruritus, positive for *T. vaginalis*. Routine treatment. April 18, negative. April 25, negative. May 1, after menstruation, no symptoms. Examination negative.

Case 13.—Mrs. J. D., aged twenty-three.

History.—November 15, 1933, pregnant six months. Profuse discharge, irritation and pruritus. Positive for *T. vaginalis*. Scrubbed with green soap, dried and dusted with powder (quinine). Delivered February 7, 1934, baby had thrush. May 11, 1935, pregnant six weeks. Pruritus and moderate discharge. Positive for *T. vaginalis*. Treated with kaomagma and picric acid crystals. *T. vaginalis* absent but some pruritus, so weekly treatments were given up to six months of pregnancy. Zinc oxide ointment with 1 per cent phenol was then used for pruritus. Very little discharge. No *Trichomonas* found during seventh month. Patient delivered January 21, 1936.

Examination.—March 3, 1936, moderate discharge and severe pruritus, positive for *T. vaginalis*.

Treatment.—March 3, 1936, routine. May 5, no symptoms since March treatment.

Case 14.—Miss M. S., aged twenty-five.

History.—Pruritus since last menstrual period.

Examination.—November 14, 1935, profuse discharge, positive for *T. vaginalis*.

Treatment.—Routine, November 14, 1935. symptoms rapidly disappeared. After December menstruation, slight irritation and discharge. Routine, which controlled symptoms and discharge. After January menstruation, no symptoms, but slight discharge. Five grams silver picrate used. After February, March, and April menstruations, no symptoms or discharge.

Case 15.—Miss A. A., aged thirty.

History.—Under treatment for three years. Comfortable while under treatment with green soap and quinine, but could not afford to continue.

Examination.—Slight irritation of vagina, with moderate discharge, positive for *T. vaginalis*.

Treatment.—November 9, 1935, routine. November 23, patient reported this was first week in three years she was comfortable without use of douches. Some slight symptoms remained. Smear and hanging drop negative. Vagina scrubbed with glycerin, green soap and mercury bichloride. November 25, slight discharge. Hanging drop negative. Treated with 5 grams silver picrate-kaolin. December 1, beginning of menstruation, slight irritation. One suppository nightly kept patient comfortable. December 7 to December 14, vaginal tract negative for *T. vaginalis*. December 14 to December 21, no discharge but some irritation. Examination negative. Checked after January menstruation and used one suppository nightly. Has had no symptoms since. June 6, 1936, examination negative.

Case 16.—Miss A. R., aged twenty-nine.

History.—Pain in right lower quadrant with irritative discharge two years ago. Appendix and right ovary re-

moved. No improvement, so dilatation and curettage was performed. Green soap douches ordered. Discharge has continued, necessitating continual use of napkin, but no irritation as long as douches were continued.

Examination.—Patient referred to me. Typical discharge. Positive for *T. vaginalis* (January 13, 1936).

Treatment.—January 13, 1936, routine. January 20, no symptoms. Instructed to omit douches. January 25, slight discharge, but no irritation. Five grams powder given. Hanging drop negative. February 5, menstruation. No symptoms, but slight discharge. Hanging drop negative. Five grams powder used. February 12, examination negative. March 5, post-menstruation, no symptoms or discharge. April 5, no symptoms or discharge. Checked, no recurrence.

Case 17.—Mrs. K. D., aged twenty-six.

History.—Pruritus for six months. Treated in another city. January 9, 1935, tincture green soap, glycerin and bicarbonate pack. Green soap douches at home, which controlled symptoms as long as used.

Examination.—Second degree retroversion. No symptoms. Moderate discharge, positive for *T. vaginalis*.

Treatment.—January 21, 1936, moderate discharge, positive for *T. vaginalis*. Routine. February 21, no symptoms, occasional slight discharge. No treatment. April 21, used suppositories during menstruation. Examination in June was negative, and patient was free of symptoms.

Case 18.—Miss G. G., aged eighteen.

History.—Irritating discharge for one year. Lysol douches used. Examination positive for *T. vaginalis*. Treated with devegan after green soap cleansing. Symptoms improved. Examination after menstruation showed moderate discharge and negative hanging drop. after using one devegan tablet each night. November 4, 1935, patient reported that as soon as she stopped using the tablets her symptoms returned.

Examination.—November 14, 1935, profuse discharge, positive for *T. vaginalis*. Routine treatment. November 21, slight discharge. December 14, slight discharge. Negative hanging drop. Five grams silver picrate-kaolin used. No symptoms after February, March, April, May and June menstruations.

Case 19.—Mrs. C. V., aged thirty-seven.

History.—Admitted for sterility study. On November 19, 1935, appeared with a profuse, irritating discharge which started two days previously, following coitus.

Examination.—Profuse discharge, positive for *T. vaginalis*.

Treatment.—Routine. No symptoms thereafter. Patient had spontaneous abortion April 14. Last seen July 8, 1936. No recurrence of *Trichomonas*.

Case 20.—Miss M. P.

History.—Discharge for last three months, with chafing.

Examination.—Profuse discharge, positive for *T. vaginalis*.

Treatment.—December 15, 1935, routine. January 15, 1936, after menstruation, moderate discharge, slight chafing. Trichomonas positive. Routine. January 22, smear negative. January 29, slight discharge, hanging drop negative. Five grams silver picrate-kaolin used. February 27, no symptoms. Negative examination. May 2, no symptoms. June 4, negative.

Summary

1. A method of treatment of *T. vaginalis* vaginitis is described, using insufflations of silver picrate and kaolin in conjunction with suppositories of silver picrate.

2. The average period of treatment is two weeks.

3. This small group of cases is submitted because of the uniformity of relief the silver picrate treatment gave each patient. It is not claimed that silver picrate is specific for *Trichomonas* vaginitis.

4. Case histories are given on twenty patients who received this treatment. The cases reported were all symptomatically severe. Twelve of the patients were students at the University of Minnesota and were unable to take douches because of their living conditions. Three patients had been treated over a period of more than two years, but their symptoms increased in severity as soon as a daily douche was neglected, previous to the present treatment.

5. All of these patients have been examined

over a period of five or six months following treatment and there have been no recurrences. As a precaution against recurrence one insufflation of the powder was used if any discharge persisted.

6. The efficiency of this treatment in the so-called "intractable cases" with the attendant disappearance of the discomfort and discharge causes a marked improvement in the mental status of the patient.

7. The silver picrate treatment as described above is successful, inexpensive, and simple. The patient can dispense with douches. Office visits can be safely limited to one a week for two or three weeks. The patient should return after her menstrual period for a re-check.

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Injection Treatment of Hernia

In March, 1936, the Council on Pharmacy and Chemistry of the American Medical Association addressed a questionnaire to a selected list of hospitals, with a view to obtaining data on the injection treatment of hernia. Replies, which were received from most of the institutions addressed, indicated that the method is not used in the majority of the hospitals consulted and that it is considered safe and effective by those using it, although many qualified their opinions as to safety and effectiveness by specifying careful selection of cases. Several unfavorable complications were recorded. The solutions used by various observers included sodium morrhuate; a mixture of phenol, alcohol and oil of thuja; and several mixtures containing tannic acid or tannic acid derivatives. In some of the institutions, preparations of proprietary character, such as the Pina-Mestre solution, Galtanol and Proliferol, were used. Subsequent to the issuance of the questionnaire by the Council, a letter was addressed to *The Journal of the American Medical Association* by some fifty physicians in good standing who have been using the injection method, citing their opposition to some of the criticisms contained in the questionnaire. It is their opinion that the method will develop greater

usefulness as it is more definitely understood, as the solutions used are more capably investigated and standardized, and as the limitations and uses of the method are more completely worked out. With this point of view the Council on Pharmacy and Chemistry is inclined to agree. Nevertheless, the following considerations should be borne in mind not only by those expert in the injection method but also by the medical profession in general: The attempted cure of hernia by the application of the method of adhesive inflammation is not new. The method has, however, failed to establish itself as a routine method for the treatment of hernia and is still in an early experimental stage. In view of these facts, surgeons who practice this method should realize the dangers from an ethical, a legal and a financial point of view. Those who continue to experiment with the injection method for the treatment of hernia with a view to standardizing this method will do well to use only such mixtures as may be prepared under their own direction in the laboratory of the hospital with which they may be associated, or mixtures prepared by competent pharmacists according to prescriptions prepared by the physician himself. (*J. A. M. A.*, September 26, 1936, p. 1052.)

CASE REPORTS

DOUBLE APPENDIX

Associated with Agenesis of the Bladder and Other Congenital Anomalies

C. W. DEL PLAINE, M.D.

Minneapolis

THE following case is presented because it shows two unusual anomalies in addition to others which are found more frequently.

The protocol of the autopsy made by the Department of Pathology, University of Minnesota, is given below.

Clinical Data.—The mother, Mrs. —, twenty-two years old, gravida 1, para 1, had her last menstrual period March 17, 1935; the date of expected confinement was December 22, 1935. There were no abnormalities during this pregnancy. She made regular visits to the doctor. Blood Wassermann and Kahn reactions were negative. She was admitted to the hospital December 29. Delivery was at 11:30 p. m., December 29; OLA presentation. There were no complications. Hemoglobin was 74 per cent; urine examination showed a slight trace of albumin and a slight trace of sugar. Microscopic examinations were negative.

The condition of the baby at birth was good except for a malformation of the anterior abdominal wall. Birth weight was 5 lbs., 1 oz. The cord measured 19 cm. and appeared to be frayed off. The placenta was normal and measured 17 x 18 cm. and weighed 453 grams. There was a marked amount of granular yellow vernix caseosa. The baby was doing well until the second day of life, when jaundice suddenly appeared. Meconium was seen coming from one of the openings in the defect on the abdominal wall. A catheter was inserted into one of these openings, but resistance was met and it could not be passed any length. No urine was seen coming from any part of the anterior abdominal wall. The infant died at 11:25 p. m., January 22, 1936.

The body was that of a well developed, fairly well nourished white baby girl weighing 2,000 grams, measuring 32 cm. crown rump and 47.5 cm. crown heel. There was slight rigor, moderate hypostasis, no edema, slight cyanosis of finger tips and lips and a generalized jaundice. The pupils were equal and measured 3 mm. There were no notable congenital abnormalities about the head and thorax. The cord was tied, but the umbilicus was found in a defect of the anterior abdominal wall, which was located in the region of the symphysis pubis. This defect of the anterior abdominal wall measured 4.5 cm. in width and 5 cm. in length. There was no anus to be seen. There was no skin over this defect in the wall. It was composed of a fleshy mass which had several openings. There was no evidence of any external genital organs.

The peritoneal cavity had smooth and glistening walls. The diaphragm arched to the fourth rib on each side. The intestines were distended with gas. The appendix was not seen or found at preliminary examination. The liver extended 2.5 cm. in the right costal margin and 2.5 cm. at the xiphoid process.

The pleural cavities and pericardial sac were free from fluid and adhesions. The thorax measured 8 cm. at the level of the fifth rib; the heart occupied 3.5 cm. of this space.

The heart weighed twelve grams. The foramen ovale and ductus arteriosus were patent. The valves, endocardium and myocardium appeared normal. The aorta and coronary arteries appeared normal.

The right lung weighed 26 grams; the left 21.5 grams. The usual lobes were found. The lungs were well aerated. No hemorrhages were seen. The bronchi showed no obstruction.



Fig. 1. Photograph of baby when three days old.

The spleen weighed 5 grams. It was dark red in color and appeared normal when sections were made.

The liver weighed 87 grams. The edges were rounded. The color was dark red. On section nothing remarkable was seen. The gallbladder was filled with bile which could be easily expressed into the common duct into the duodenum.

The esophagus, stomach, and duodenum were normal. The stomach contained a small amount of white curdled material. There was no obstruction from the duodenum to the terminal part of the ileum which was found in the region of the herniation of the abdominal wall. At various points throughout the small intestine bile stained fecal material was seen. The small intestine measured 138 cm. in length. There appeared to be an opening for the small intestine on the anterior surface of this defect. There appeared to be a common cavity into which the small intestine and the large intestine emptied. The large intestine measured 8 cm. and terminated in a blind projection from this common junction. [At the tenth fetal month the average normal length of the large intestine is 64.5 cm.; the average normal length of the small intestine is 301.5 cm. At birth the average normal length of the large intestine is 66.0; the average normal length of the small intestine is 338.5 cm.]¹⁸ At the junction of the ileum and the cecum there were two appendages which appeared to be appendices. The appendage on the right measured 2 cm. and the one on the left of the cecum measured 1.8 cm. In this remnant of the colon there were white contents in the lumen. The small intestine was found anterior to the cecum. The opening of the

small intestine through to the outside was found in the midline and upper area of this wall defect. There was a smaller similar opening, which was found to the left and about 1 cm. below the small intestine opening, which lead into the blind end of the colon. There was no great omentum found and there were thin adhesions between the stomach and the small intestine. The pancreas weighed 1 gram and was found in its usual position; section appeared normal. The right adrenal weighed 2 grams, the left 2.5 grams. Section appeared normal.

The right kidney weighed 10 grams, the left 9.5 grams. The capsules stripped with ease. The usual fetal lobulations were seen. On section the normal relation of cortex to medulla was seen. The pelves appeared normal. Neither ureter was distended and both appeared normal in shape. The right ureter terminated in an opening into the right vaginal cavity. It curved upward and around the right side of the uterus. The left ureter pursued the normal course but emptied into an opening to the outside in this defect of the abdominal wall. It also curved posterior and to the left of the left uterus. There was no organ which could be found that resembled the bladder. There were two separate sex organs, one on either side of the pelvis. The right side contained a tube, an ovary, a uterus, a cervix and a vagina. The vagina appeared long and the cervix was not plainly seen. The uterine cavity was large and the uterine wall was thin. The sex organ on the left contained a well formed ovary, a tube, and a solid organ which was considered probably to be a uterus. There was no cervix found. The cavity into which the left ureter opened might be a vagina. There was a very small opening from this cavity to the outer wall of the abdominal defect. There was a larger genito-urinary opening on the right side and this led into the vagina. There was no evidence of labia found.

The aorta was normal. There was no lymphadenopathy.

There was no hemorrhage in the ventricles of the brain. There were no hemorrhages or tears of tentorium or falx.

The epiphyseal lines of femur and tibia appeared normal.

The skeletal system showed no defects.

The umbilical cord contained two arteries and one vein.

Microscopic Examination: Sections of liver, spleen, pancreas, adrenal and kidney appeared normal.

Diagnoses: 1. Multiple congenital anomalies: (a) Defect of anterior abdominal wall; (b) Agenesis of bladder; (c) Double uterus and double vagina; (d) Malformation of colon; (e) Double appendix; (f) Agenesis of great omentum; (g) Agenesis of external genital organs. 2. Jaundice.

A search of the literature shows only eight reported cases of double appendix. Of these, six appear to be cases of true congenital malformations. They are briefly summarized below. Emrys-Roberts and Paterson,⁶ in 1906, reported rather casually a still-born full-time fetus in which "on each side of the junction of the small intestine with the cecal pouch is a small sacculated and curved appendix."

The following year Schooler¹⁰ reported operating on a woman twenty-three years old who had one normal and one gangrenous appendix.

In 1911, Young²¹ reported an appendectomy in which one appendix contained pus, and the other was ruptured. These measured 3 inches and 3.5 inches in length, each having a meso-appendix.

Berthold,¹ in 1932, reported operating on a sixty year old woman for strangulation ileus. Two appendices were found, one 7 cm. long in the normal site, the other 5 cm. long, 2 to 3 cm. laterally, growing from the haustrum.



Fig. 2. Two appendices.

Pratt,¹³ in 1933, reported a case of two appendices which he believed to be the homologues of avian ceca rather than true appendices. He pointed out that, "There is no point in the formation of the human appendix where doubling might logically be expected to take place."

Clavel and Closon,³ in 1933, found at operation, in a woman thirty years old, two appendices about 1 cm. apart, but with a single meso-appendix between them. They were enclosed in a common serosa and were supplied by a single appendicular artery.

These cases are quoted here in answer to the rather sweeping statement of Kelly and Hurdon,¹¹ "In regard to misplaced and supernumerary appendices, most of these can be accounted for on other grounds. In a number of cases appendices have been reported as arising from the ileum, at various distances from the ileo-cecal valve. Without wishing to criticize these statements it seems more probable that these authors have seen and described Meckel's diverticulum, i.e., the remains of the vitelline duct of the embryo. It is also possible that one of the epiploic appendages which are found at intervals along the intestine may have been mistaken at times for an atrophic appendix."

A brief summary of the embryology of the human intestine may be of interest. In 5 mm. embryos there are two limbs of the intestinal loop, the cephalic and the caudal, connected ventrally with the yolk stalk. Caudally the intestinal tube expands to form the cloaca.

found reported in literature are listed in the bibliography below.

I wish to thank Dr. Thelma Perozzi, of the Department of Pathology, University of Minnesota, for her careful work in performing the above autopsy; Dr.

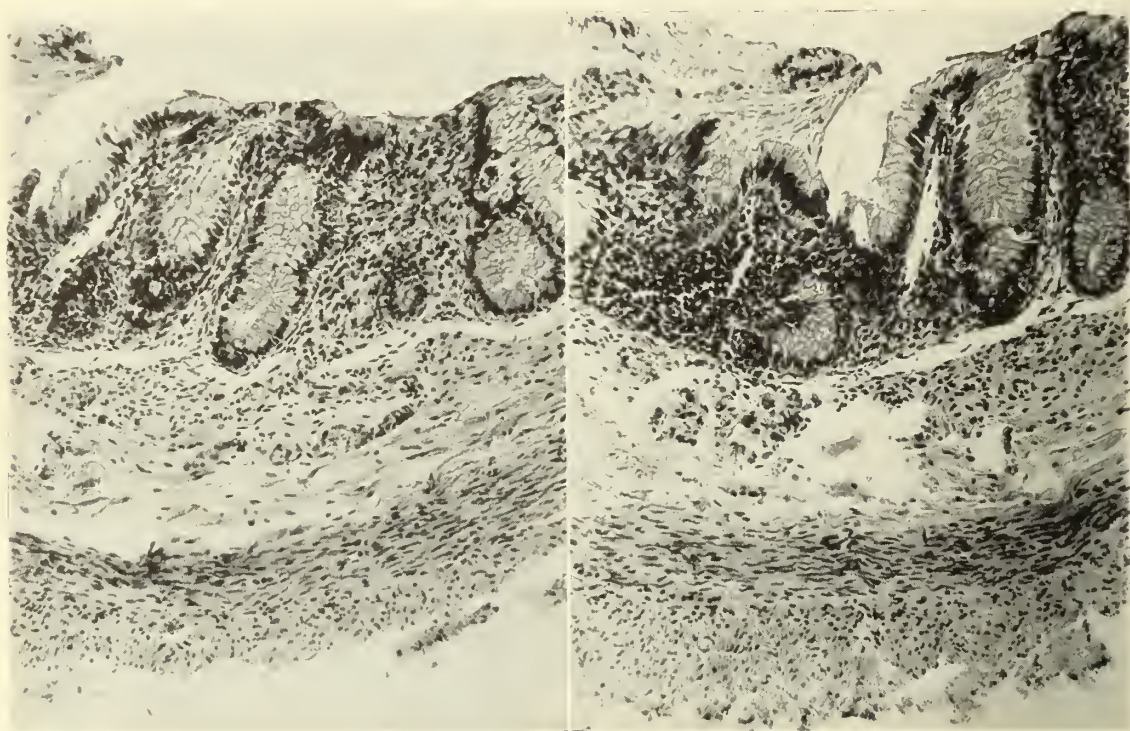


Fig. 3. Microscopic section through the wall of each appendix.

Before the 9 mm. stage is reached, the attachment to the yolk stalk normally disappears. Also in the caudal limb of the intestinal loop there is formed an enlargement, due to a ventral bulging of the gut wall, that marks the anlage of the cecum and the boundary line between the large and small intestine. At the 17 mm. stage the distal end of the cecal anlage begins to lag in development, forming the future vermiform appendix, which by the 65 mm. stage is distinct from the cecum.

So the appendix can be regarded as an undeveloped cecum.

The comparative anatomy of the appendix is interesting. The true appendix is found only in man and the anthropoid apes. The little ant-eater is the only mammal to have two short cecal pouches that are well defined processes. Herbivorous birds have two long cecal pouches, which can readily be seen in domestic fowls.

As Pratt¹³ states, however, "The bird is a distinct relative not an ancestor of man, so that the human embryo does not pass through an avian stage in the process of development."

In regard to the absence of the urinary bladder, one can say little except that it is one of the rarest of anomalies of the urogenital cases. Those few cases

E. T. Bell, Head of the Department of Pathology, University of Minnesota, for his suggestions and cooperation in obtaining photographs of the sections of the appendices; and Dr. Richard E. Scammon, Distinguished Service Professor in the Graduate School, University of Minnesota, for his kind suggestions and criticism.

Conclusions

1. Double appendix in the human being is rare.
2. Enough cases have been reported so that surgeons should bear in mind such a possibility when performing an appendectomy.

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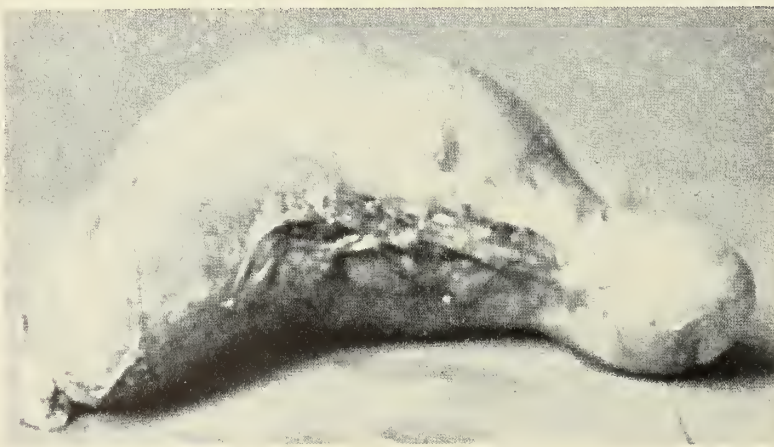
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MUCOCELE OF THE APPENDIX

O. E. SARFF, M.D.

Virginia, Minnesota

E. M., a schoolgirl eighteen years of age, was admitted to the hospital June 8, 1936, at nine p. m. She was complaining of nausea, vomiting and crampy pains in the right lower quadrant, which dated back to four p. m. of June 7, a total of twenty-nine hours.



Photograph (actual size).

The patient had had no previous serious illness but during the past year had had several attacks of vague lower abdominal distress at no time severe enough to consult a physician.

The present attack subsided the morning of June 8 but recurred at three p. m. of the same day with increasing violence.

The patient, when seen, had a leukocyte count of 17,900, pulse rate 88, temperature 99.4 and normal urine. There was no distention of the abdomen, no palpable mass, but there was exquisite tenderness over McBurney's point, rebound tenderness and grade I muscle spasm.

Pelvic examination revealed no mass but considerable tenderness was demonstrated in the region of the right uterine adnexa.

The abdomen, which was opened under ether anesthesia through a right rectus incision, contained a small amount of free serous fluid.

A tumor mass was felt which was bound down in its entirety to the cecum and when visualized was found to be covered with a so-called "Jackson's veil." The tumor was removed without difficulty and the raw surfaces were peritonealized.

The closure was without drainage, convalescence was without incident and the patient was discharged on the ninth day.

Pathologic Report

Macroscopic.—This is an appendix, preserved in formalin, measuring 11.0 cm. in length and up to 4.2 cm. in diameter. The serosa is quite congested. The lumen is very much distended, filled with masses of coagulated mucous material.

Microscopic.—The mucosa of the appendix is atrophic. The epithelial lining is extensively desquamated. The submucosa is thin and infiltrated with lymphocytes. The muscular layers are thinned out by the distention. The serosa is infiltrated in places with

a few lymphocytes. No tubercles can be demonstrated in the examined sections.

Diagnosis.—Mucocoele of the appendix. The accompanying photograph is an enlargement to the actual size.

SIAMESE TWINS*

Report of Delivery and Successful Operation

HILLARD H. HOLM, M.D.

Glencoe, Minnesota

THERE are several facts concerning the delivery of the babies described in this report which make the case especially interesting. The twins were born during a raging blizzard on January 8, 1927, in a farm home approximately fifteen miles from town. I was called to attend the case.

time, instead of a head and a foot, the infants could not have been born without a cesarean section.

Both infants were normal in every way except for their being attached together. Their rectal temperatures were each 99.8 degrees, and pulses 125. Each child's heart and lungs were normal in every way. Their abdomens were joined together over an area approximately 4 inches in diameter and 13 inches in circumference. The ensiform cartilages were continuous from one child to the other. One umbilicus was present and entered the lower portion of the attachment. Liver and spleen were not palpable in either child.

Blood examination on February 28 showed a hemoglobin of 76 and 78 per cent and red cells of 4,100,000 and 4,300,000 respectively.

X-ray examination was made and plates were taken.



Fig. 1 (left). Siamese twins born January 8, 1927. Photograph taken six weeks after birth.

Fig. 2 (right). Photograph taken two weeks following operation.

The mother was a primipara. Labor had gone along normally for about eighteen hours. Previous examination of the abdomen had revealed that undoubtedly twins were to be born, as two separate fetal heart tones could be heard, although the parts could not be definitely determined. At the end of nineteen hours of labor the head of one child was delivered normally, the occiput anterior. On attempting to deliver the shoulders they were found to remain stationary and could not be delivered. It was a baffling situation. After studying the situation carefully I passed my right hand up into the vagina, up alongside the abdomen of the child to be delivered. The shoulders slipped out, and along came the feet of the second child as well as the buttocks and the abdomen. The buttocks and feet of the first child were then delivered free of the vagina and a connection was noticed between the twins. The head of the second child was then delivered, as in a breech extraction. One umbilical cord was present, attached at the under surface of the union of the two babies. After the cord had been clamped and tied and dressed it was noticed that the pouch connecting the two children was twisted. The infants were then rotated so that they were face to face, which apparently untwisted the pouch connecting them. It was a strange sight to behold, and I must admit that Dame Fortune was with me because if the two heads had presented at the same

One of the children was given a mixture of barium with mother's milk, which it took from the nursing bottle. This was followed up by means of the fluoroscope and it was found that the barium and milk mixture entered into a normal stomach, from which it quickly passed out into the small intestine. The child was spanked and caused to cry, and under the fluoroscope it was seen that the small intestine would push over into the abdominal cavity of the other infant through the pouch, and when the baby stopped its crying the intestine would go back into the proper abdomen. A similar procedure was carried out with the other infant and showed the same condition. X-ray plates were also made. From this examination it could be determined that each child had a separate gastrointestinal tract and that there was no union of either stomach to stomach, or intestine to intestine.

As Siamese twins could not possibly go through life joined in such a manner and since they had separate organs, it was decided to separate them. Consequently on March 1, 1927, when they were about seven weeks old, operation was undertaken.

The infants were placed on their sides, being the right side of one baby and the left side of the other. A light ether anesthetic was given. With the scalpel an encircling incision was made through the skin around the pouch, midway between the infants and splitting the umbilicus below. Entrance was gained into the pouch through the upper, or nearest, portion. In order to get into the pouch a thin fascia, a small muscular layer and finally the peritoneum, were incised. This was done with extreme care. Moist packs were then inserted to hold back the intestines and the incision carried completely around the pouch through the fascia,

*Read at the annual meeting of the Southern Minnesota Medical Association, Albert Lea, Minnesota, August, 1936. This report was awarded a medal as being the most interesting case report presented at the meeting.

muscle and peritoneum up to the ensiform cartilage, which was continuous from one infant to the other. This was cut with a straight scissors. The falsiform ligaments of the livers of the infants being also united, clamps were applied and they were severed and tied off with plain catgut No. 2. The infants were thus completely separated. Following the separation one of the infants was noticed to become very pale and to stop breathing. The anesthetic was stopped and hypos of adrenalin and camphorated oil, which had been held in readiness, soon brought the infant back to normal condition. It was now necessary to sew up the openings into the abdomens where the pouch had been. This was a difficult procedure and had to be done quickly. One of the infants was tended by a nurse, the anesthetic being stopped on that one. On the other infant the peritoneal covering was then picked up and dissected back. This was sutured in a continuous running locked suture of plain catgut No. 2. Four stay sutures were then placed through the skin, subcutaneous fat, recti fascia and muscle, down to the peritoneum. These were left untied. The recti fascia was then sutured together with No. 2, forty-day chromic catgut in a running locked suture. It was somewhat difficult to draw this together in the midportion, due to the fact that we were making a straight wound out of a round opening. The skin was then sutured with plain catgut No. 2 in a running, continuous suture. The stay sutures were then tied and dressings applied. The other infant was then given a small amount of anesthetic and the suturing of the pouch was done in a like manner. Each infant had a small umbilicus at the lower end of the incision after the operation had been completed.

After the infants had been put to bed they were both given hypodermoclysis of normal saline into each leg, approximately 150 c.c. being given to each baby. Twelve hours postoperative the mother nursed each baby, and they took the breast well. She continued to nurse each infant every four hours during their stay in the hospital. Each infant occasionally had crying spells, which was undoubtedly due to some pain, but otherwise they had a remarkable convalescence, the incisions being completely healed in ten days, at which time the stay sutures were removed.

The infants were seen every month after the operation for an entire year, during which time they were nursed by the mother. At the end of five months solid food such as cereals and mashed vegetables were added to their diet. After the first year they were seen at frequent intervals and were weighed and carefully watched. At the present time they are running about the house, have good appetites, and seem strong, healthy and normal in every way.

HERNIATED EMPYEMA OF GALL-BLADDER OPENED THROUGH SKIN INCISION

ERNEST W. COWERN, M.D.

North Saint Paul

McG., male, white, sixty-six years of age, was admitted to St. John's Hospital, St. Paul, on January 31, 1936, suffering from chronic Bright's disease with impending uremia. He had had urinary incontinence and some dysuria for several weeks.

The house doctor's admitting note was as follows: "White male, sixty-six, appears somewhat doxy. Faint odor of acetone on breath. Heart negative. Blood pressure 120/80. Abdomen negative. Lungs, numerous crepitant râles on inspiration, left base."

A history obtained by the interne gave the following data: hoarseness for last three weeks; pain in right upper quadrant of abdomen noticed by the patient for a month; cough and expectoration of pus for a month.

Physical examination by the interne gave no important information except that he found tenderness in the right upper quadrant of the abdomen where there was a scar due to a gallbladder operation twenty-one years before. Blood pressure was 120/80. The heart was normal. My examination showed some râles and dullness in the left upper chest posteriorly.

Further history elicited the fact that the man had had both gonorrhea and syphilis some years before.

A catheterized specimen of the urine on the day of admission was cloudy, specific gravity 1.024, acid, no sugar, 2 plus albumen, 2 plus acetone, 3 plus pus, occasional blood cell, 1 plus epithelium, occasional granular casts. The day after admission, the blood urea nitrogen was 56.4 mg. per 100 c.c. of blood.

On the second day, the chest condition was noted as improved and the temperature had fallen to normal. However, the next day, the temperature rose to 100.8, although the patient felt and looked better. Two days later, at my next visit, I noted a return of the chest dullness and, from this time on, the lung condition became gradually worse. On February 7, a week after admission, I noted that the dull area had become larger. The next day, February 8, there were several dull areas, and the patient was placed in isolation because of bronchopneumonia.

Previous to the lung involvement, his general condition had markedly improved, and the involuntaries of both bladder and bowel, which had been present for the first three days, had ceased.

On February 6, two days before he was placed in isolation, he complained of pain under the right costal arch. This was thought to be due to pleural irritation aggravated by coughing, and a wide bandage was applied to restrict movement.

On February 12, I noted the presence of a nodular mass below the right costal arch, sensitive to touch. The next day I wrote: "The mass is larger this A. M., very sensitive to pressure, and causes him much distress. Needling brought a small amount of stringy, yellow material. I made a small incision in the mass and evacuated some bile-stained fluid combined with a glairy, stringy material. I think this is an adherent, herniated hydrops of the gallbladder. The incision gave him much relief." A gauze drain was inserted which was removed the following day. On removing the gauze the pressure in the gallbladder was so great that its contents were ejected for a distance of fourteen inches. At this time there was pus in the discharge and many brown flakes (inspissated bile). A rubber drain was substituted.

The rubber drain was removed daily and the cavity irrigated with saline solution. A light showed the lining of the cavity adherent to the subcutaneous structures. There was a large amount of glairy mucous discharge with many stones, well formed and well faceted. At this time the cavity measured approximately 4.5 cm. in each direction except directly downward.

On February 19 I enlarged my incision to a length of 2.5 cm. The cavity now appeared to be of very irregular depth, in one place being 7 cm. On this day, by irrigation and with a spoon, I removed thirty-three stones of various sizes, the largest being over 1.25 cm. in length and 0.5 cm. wide. There was less drainage, but some pus, together with thick, glairy bile.

The condition improved rapidly so that on February 22 I was getting nothing but clear, golden bile and the use of the tube was discontinued.

On February 21, on account of persistent cough, fever, and much expectoration, an x-ray picture of the chest was taken which revealed extensive, bilateral, advanced tuberculosis, with cavity formation in the left

(Continued on page 758)

CLINICAL PATHOLOGIC SEMINAR*

Conducted by E. T. BELL, M.D.

Department of Pathology, University of Minnesota

Minneapolis

Adherent Pericardium

Case 29.—A boy, nine years old, was admitted to hospital March 14, 1936. In 1931 he had joint pains and fever and was confined to bed for several weeks. Following this the mother noticed that the child grew tired very easily when playing with other children. In 1932 he was brought to the Out-patient Department for tonsillectomy. Routine physical examination disclosed rheumatic mitral heart disease and the child was advised to rest a great deal with modified exercise. In the fall he entered Lymanhurst, where he remained for several months, after which he was transferred to the Dowling School. In the fall of 1934 x-ray of the heart was thought to show a mitral lesion. The child got along fairly well until six days before the present admission, when he developed precordial pain and pain over the left side of the chest which became progressively worse and he was brought into the hospital.

The temperature was 102°; pulse 130; respirations 28; blood pressure 88/70. The heart was markedly enlarged to the left and to the right; systolic and diastolic murmurs were heard over the second left interspace; also systolic and questionable diastolic murmurs over the apex and transmitted to the axilla. The liver was definitely palpable. There was marked tenderness in the mid-epigastrium and there was thought to be some free fluid in the peritoneal cavity.

Urinalysis showed a faint trace of albumin, an occasional pus cell and specific gravity of 1030. The hemoglobin was 62 per cent; red blood cells 4,070,000; leukocytes 8,350 with 50 per cent polymorphonuclears, 42 per cent lymphocytes and 7 per cent monocytes. On two occasions nose and throat cultures showed hemolytic streptococcus. X-ray examination of the heart at this time showed marked enlargement of the cardiac shadow to both left and right with considerable prominence in the region of the pulmonary conus. The contour of the heart was thought to indicate a mitral type of enlargement. The transverse cardiac measurement was 15.2 cm., showing a marked change since the x-ray taken on April 11, 1934, at which time this measurement was 10.1 cm. An electrocardiogram showed prolongation of the auriculoventricular conduction time with high, broad, notched P-waves in all leads. The conclusion was again mitral disease.

The child ran a septic type of temperature, ranging from 100° to 103°. He gradually grew weaker and expired on May 9, after nearly two months of hospital residence.

Postmortem findings: Moderate pitting edema of the ankles; no ascites; 100 c.c. of clear fluid in the right pleural cavity, 50 c.c. in the left. Fibrous pericardium strongly adherent to the posterior surface of the sternum and the costal cartilages anteriorly. The pericardial cavity was completely obliterated by strong fibrous adhesions. All the chambers of the heart were hypertrophied and dilated. There was more hypertrophy of the left ventricle than of the right. The leaflets of the mitral valve were slightly thickened; the chordae tendineae slightly shortened; however, there seemed to be little or no insufficiency or stenosis of the valve. There were a few small rheumatic vegetations on the aortic leaflets; these did not interfere with the function of the valve. The tricuspid and pulmonary valves were normal. There was rather marked bron-

chopneumonia in the right lung. The spleen weighed 90 grams and showed chronic passive congestion. The liver weighed 1,030 grams and showed marked chronic passive congestion. Other organs normal.

Diagnoses: (1) Hypertrophy and dilatation of the heart, due mainly to adherent pericardium; (2) chronic heart failure with general passive congestion; (3) slight scarring of the mitral valve; (4) terminal bronchopneumonia.

Cultures of the blood and spleen, taken at post-mortem, were negative.

Comment.—Adherent pericardium is one of the complications of rheumatic fever. In a number of cases of acute rheumatic fever pericarditis develops. In this instance apparently pericarditis developed at the time of the attack of rheumatic fever 5 years before death. The pericardial exudate was organized and the pericardial cavity became obliterated by old fibrous adhesions. Fixation of the heart anteriorly to the sternum is a factor of great importance. The adherent pericardium increases the work of the heart during systole and results in gradual cardiac hypertrophy. The slight thickening of the mitral valve may have contributed to the hypertrophy to some extent in this case.

Carcinoma of the Rectum

Case 30.—The patient, a man seventy-three years old, was first admitted May 20, 1935, with diarrhea consisting of numerous small liquid movements occurring every half to three-quarters of an hour; this symptom had been present for the past four weeks.

On physical examination he was well developed and well nourished; a few rales in the bases of the lungs; blood pressure 180/80. The heart appeared slightly enlarged to the left. Rectal examination showed a large mass on the anterior wall of the rectum in the region of the prostate; it was firm and somewhat nodular; it extended beyond the reach of the examining finger.

Hemoglobin 84 per cent; leukocytes 10,400; 70 per cent polymorphonuclear leukocytes, 27 per cent lymphocytes; 2 per cent monocytes, 1 per cent eosinophils. Urine: Negative to + albumin; occasional granular casts; negative to a few erythrocytes; on several occasions it was loaded with leukocytes. Feces positive for visible and occult blood. The patient had no fever.

Following admission the rectal lesion was diagnosed as inoperable carcinoma. In the meantime the patient developed epididymitis of the right testicle and this was removed; the diagnosis was chronic suppurative epididymitis. The carcinoma was treated by fulguration on two occasions and the patient was discharged August 12, 1935. He obtained relief by this procedure until in February, 1936, when he was readmitted because of constipation; he was now poorly nourished and emaciated. However, the bowel movements became normal without treatment and he was again discharged on February 19 only to be readmitted April 8 because of recurrence of constipation. At this time the mass appeared to be entirely obstructing the rectum and there was considerable pus exuding from the anus. He gradually became weaker and drained small amounts of bloody fecal material from the anus. He became irrational and died at 12:40 P. M., May 5, 1936.

Postmortem findings: Rather marked emaciation;

*Continued from the October, 1936, issue.

no edema; no fluid in the serous cavities. Heart 325 grams; mitral and aortic leaflets showed several large soft vegetations; there was rather marked narrowing and sclerosis of the coronary arteries; there were large scars in the heart muscle. The lower lobe of the right lung was extensively consolidated from a bronchopneumonia. There was a single stone 1.5 cm. in diameter in the gallbladder; the wall of the gallbladder was somewhat thicker than normal. There was a large fungating gelatinous tumor in the rectum which involved its entire circumference and extended downward to within 4 cm. of the anal ring and measured 12 cm. in the long axis of the bowel; it had formed a fistula through the posterior wall of the bladder; a large ulcer was noted in the bladder which communicated with the rectum. No metastases were found even in the pelvic lymph nodes.

Diagnoses: (1) Adenocarcinoma of the rectum with formation of a rectovesical fistula; (2) terminal bronchopneumonia; (3) terminal acute bacterial endocarditis; (4) gangrenous cystitis.

Comment.—The presenting symptom in this case was diarrhea which was probably due to obstruction. Fecal material retained above the obstruction becomes liquefied before it can pass through the narrow opening. This is a fairly typical course of advanced carcinoma of the rectum. The patient was inoperable when first seen. The disease spread into the bladder, as it often does. Even at the time of death there were no metastases so that, if the condition had been recognized early, there might have been a good chance for a cure.

Lymphatic Leukemia

Case 31.—A white girl, sixteen years of age, was admitted April 24, 1936, complaining of nodules in both cheeks and in the skin of the abdomen; she also complained of marked weakness. In August, 1935, she first began to feel tired and dizzy. She was examined by a physician at that time who found hemoglobin 28 per cent. She was put on iron therapy. Several weeks later she developed pneumonia and was confined to bed for about nine days. During this time she was given several transfusions and the hemoglobin rose to 44 per cent. Anemia therapy was continued. In October, 1935, hemoglobin was 96 per cent and she returned to school, as she felt fairly well. In December the hemoglobin had fallen to 68 per cent and anemia therapy was given again. She contracted a severe cold with bronchitis; she vomited a good deal during this attack.

Early in January, 1936, the hemoglobin was found to be 20 per cent and she was taken to a hospital and given several blood transfusions. In March she first noted lumps in the skin of the cheeks and small masses in the skin of the breast and over the abdomen. She was very pale and weak.

Admitted April 24; she appeared markedly anemic; large ulcers of the buccal mucosa; tongue coated; throat injected; several masses were palpable in the maxillary regions; numerous small nodules in the skin of both breasts and in the skin of the abdominal wall. No disease of the heart or lungs demonstrable. Blood pressure 112/62. The abdomen was flat; there was no tenderness; no deep masses; the spleen was palpable. The tumors of the skin of the abdomen varied from 1 to 5 mm. in diameter.

Urine: normal. Blood: hemoglobin 73 per cent; leukocytes 1,900; 100 per cent lymphocytes. A second blood count showed leukocytes 1,200, 100 per cent lymphocytes, 6 per cent of which were immature. Biopsy from one of the tumors in the abdominal wall showed that the tumor was composed of lymphoid cells infiltrating the tissues. Because of absence of granulocytes pentnucleotide was given; liver extract was also

administered. There was practically no favorable response.

Just before death the white cells numbered only 390; some immature lymphocytes were found in all the smears. On the day before death a severe ulcerated stomatitis with gangrene developed. Death occurred May 4.

Postmortem examination: No edema; moderate emaciation; no fluid in the peritoneal cavity; 400 c.c. of bloody fluid in the right pleural cavity, 200 c.c. in the left. The heart showed no disease. There was congestion and edema of the left lung and areas of bronchopneumonia in the lower lobe of the right.

The spleen weighed 205 grams and showed abundant pulp. No tumors were noted in any of the organs. Multiple follicular cysts in the right ovary. The marrow of the long bones was deep red in the positions in which it is normally yellow.

Microscopic examination of the liver, spleen and kidneys showed no leukemic infiltration but the bone marrow showed the typical picture of lymphatic leukemia.

Diagnosis: Lymphatic leukemia.

Comment.—It is noteworthy that the patient had leukopenia during the period when she was in hospital. Leukopenia is seen rather frequently in lymphatic leukemia. The evidence of leukemia in the blood smear was the high percentage of lymphocytes and the presence of immature lymphocytes. It is remarkable that there were no leukemic infiltrations in any of the organs except the bone marrow and the skin.

Fat Embolism of the Brain

Case 32.—A white man of sixty-two was admitted May 3 and died May 10. He was walking along the highway when he was struck by an automobile. He did not know the exact time but it was after dark. Immediately following the injury he was unconscious and was taken to a hotel where medical aid was administered. On admission to the hospital he was conscious and able to answer questions intelligently. There was a laceration on the left eyelid and contusions over the left cheek. Pupils equal and regular, reacting equally to light and accommodation. Chest symmetrical; expansion equal on both sides; some tenderness over the lower ribs of the left chest on pressure; lung fields clear to percussion and auscultation; posterior chest hard to examine because of inability to move patient without producing severe pain; no enlargement of heart; sounds and tones of good quality. Abdomen soft; no spasm, rigidity or tenderness. Upper extremities negative. There was marked discoloration in the middle third of both tibias down to the ankles; fracture of right tibia and fibula with fragments lying just beneath the skin and easily felt, but not compound; compound fracture of the left tibia and fibula; laceration in the soft tissues, measuring 2 to 3 cm. in diameter.

X-ray revealed a comminuted fracture in middle third of right tibia with posterior displacement of distal fragment; mediolateral alignment fairly good; several loose fragments about area of fracture; two fractures in fibula, both involving middle third; distal third of fibula displaced medially. Left leg showed an extensively comminuted oblique fracture at the junction of the middle and lower thirds of the tibia with good mediolateral alignment and rather marked posterior displacement of the distal fragment; associated fracture in lower third of left fibula and another at the junction of the middle and upper thirds. There was evidence of a lesion of the soft tissue in the region of the fracture of the tibia. X-ray of the skull was not entirely satisfactory; no definite evidence of fracture; no evidence of gas in soft tissues.

Urine, cloud of albumin, occasional casts, many red and white blood cells. Blood: hemoglobin 72 per cent; white cells 11,000; nonprotein nitrogen 66 mg.; repeated 70.1 mg.

May 4, Kirschner wire was placed in os calcis of both feet in an effort to correct the overriding of the fragments.

May 5, deeply comatose. Neurologic examination showed a positive Hoffmann on the left and right; pupils small, equal and fixed; external strabismus present but slight. Conclusions: fat embolism of brain or cerebral hemorrhage (either subdural, intracerebral or both). Advised trephining to locate hemorrhage and remove clots but patient's condition was so poor that it could not be done. May 8, still comatose; Cheyne-Stokes respiration; findings suggest pneumonia. Death occurred May 10.

Postmortem examination. Fractures were found as described in the clinical record; no blood or excess fluid in the peritoneal cavity; the right pleural cavity contained about 400 c.c. of blood. The heart showed no disease. The right lung weighed 1,450 grams, the left 1,040 grams; massive bronchopneumonia was present. No disease of the liver or spleen. Right kidney absent; left kidney weighed 305 grams; this is an example of unilateral kidney. There was no hemorrhage in the soft tissues of the scalp; no bruising of the

brain and no blood in the subarachnoid space; the arteries of the brain showed no disease. On section large numbers of petechial hemorrhages were found throughout the white substance.

Microscopic examination of these hemorrhages showed that the majority were small hemorrhages with a blood vessel in the center, the blood vessel being filled with a fat droplet. The fat was demonstrated by staining frozen sections with sudan iii.

Diagnoses: (1) Fat embolism of the brain; (2) bronchopneumonia; (3) fractures of the bones of the legs; (4) unilateral kidney.

Comment.—Fat embolism is an occasional cause of death after fractures of the large bones. The fat from the ruptured fat cells in the bone marrow enters the veins of the marrow and is carried to the lungs. A great many fat globules pass through the relatively large capillaries of the lungs and lodge in those of the brain. Hemorrhage occurs from the minute vessels around each lodged fat droplet in the brain substance. This gives rise to the petechial hemorrhages that are characteristic. When a patient goes into coma a day or two after sustaining a fracture of a bone, fat embolism of the brain is to be suspected.

"Subenon" for Arthritis and the American Chemical Society

For several years the annual sessions of the American Chemical Society have been accompanied by extraordinary publicity in the lay press concerning new chemical discoveries applicable in the field of medicine and particularly for the treatment of disease. This year, however, even before the opening of the annual session of the American Chemical Society, newspapers throughout the United States carried a story, emanating apparently from the publicity department of the American Chemical Society, indicating that a new specific had been developed for the treatment of rheumatism and arthritis. The item submitted to the press stated that "a compound which curbs arthritis, economically the most devastating of all chronic diseases, was reported by Dr. Herman Seydel (President Seydel Chemical Co., Jersey City, N. J.)." It was said that "the new compound involving the medicinal application of benzoates, has proved effective in clinical tests covering two years at the Jersey City Medical Center." Furthermore, Herman Seydel, Ph.D., reported that "in this calcium double salt of benzyl succinic and benzoic acids we offer the solution of an age-old problem. It remains for the medical profession to adopt it and employ it properly." Thus the speaker to appear before the American Chemical Society put the medical profession of this country squarely "on the spot" with a demand that it use his proprietary remedy. The secret behind this is, of course, the fact that the Seydel

Chemical Company is a manufacturing organization which specializes in the manufacture of "benzoic compounds." In his statements "Dr." Seydel mentioned a favorable experience with the treatment at the New York Postgraduate Hospital. The superintendent of that institution, W. B. Talbot, telegraphed protesting reference to the New York Postgraduate Hospital in the newspaper reports of Herman Seydel; that the hospital had used experimentally his product "Subenon" but found it useless in arthritis; and that no favorable reports had been given out from this hospital about Subenon. As the publicity associated with "Dr." Seydel's exploitation of his product came to newspapers with the sponsorship of the American Chemical Society, a well known organization presumed to be composed of scientific men subject to the usual ethics which control scientific workers, press associations and newspapers cannot be condemned if they failed to recognize the definitely commercial background and effect of this item. Neither can thousands of unfortunate sufferers from arthritis be condemned if in response to this item they demand of their physicians that they be given opportunity to test this unestablished drug. The American Chemical Society cannot dodge its responsibility in this case. It is neither within its province nor within its competence to give critical judgment on the treatment of disease. If it wishes to maintain the respect of the medical profession, and the public, the American Chemical Society cannot permit itself to be used as an agent for unestablished proprietary remedies in the exploitation of the sick. (J. A. M. A., September 12, 1936, p. 878.)

EDITORIAL

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Mandelic Acid

THE therapeutic use of organic acids in the treatment of infections of the urinary tract is based on the observation of the bactericidal effect of the urine of patients who received a ketogenic diet. The effective substance produced as a result of a ketogenic diet was shown by Fuller to be beta-oxybutyric acid, which, in a concentration of 0.5 per cent and at a pH of 5.5 causes the death of bacteria. This acid, which is burned when the patient is receiving a normal diet, appears in the urine only when the patient is receiving a high-fat diet.

Rosenheim recently introduced another organic acid, mandelic acid, which can be taken by mouth and which is excreted unchanged in the urine. Mandelic acid corresponds very closely to beta-oxybutyric acid in its bactericidal

properties, and its therapeutic use necessitates no dietary regimen. Helmholtz and Osterberg showed that at a pH of 5.0 a concentration of 0.25 per cent mandelic acid is bactericidal and that at a pH of 5.5 a concentration of 1.0 per cent mandelic acid is necessary to produce the death of bacteria. The higher the concentration of the acid and the lower the pH, the greater the effectiveness of the drug. Three grams of the ammonium salt, when given to adults four times a day, usually produce a bactericidal urine, provided the output is about 1,000 c.c. If the sodium salt is used, an acid-producing salt, such as ammonium chloride or ammonium nitrate, must also be given to acidify the urine.

As far as is known at present, no harmful effects on the kidneys have resulted from the ketogenic diet. Mandelic acid is not without harmful effects. After its administration, hematuria, albuminuria, and reduced renal function have been noted. Patients with impaired renal function have difficulty in excreting the acid in high concentration, and a urine of low pH. In cases in which there are unilateral renal lesions, there may be marked differences in the ability of the two kidneys to excrete the acid. The infected kidney may be unable to excrete a bactericidal urine and thus no beneficial effect is obtained in spite of the fact that the concentration of acid in the bladder may be within the bactericidal range.

Harper M. Workman

THE inexorable march of time again took its toll in medical ranks when death summoned Dr. Harper M. Workman, long identified with organized medicine in Minnesota.

It was in 1890 that Dr. Workman joined the Minnesota State Medical Association and in 1903, when the most important body of our association, the Council, was first formed, Dr. Workman was elected Councillor of the Fifth District. Except for the year 1917 when he served as president of the State Association, Dr. Workman has been a councillor continuously since 1903, having been president of that body since 1922.

Only those who have been associated with Dr. Workman in the various Association activities in which he has become involved, whether they were the deliberations of the Council, the activities of the Legislative Committee, or the work of the Historical Committee, can appreciate the energy and enthusiasm he manifested for the welfare and interests of medical practice in Minnesota. Many were the times that he subordinated his own interests for the good of his fellow practitioners by absenting himself from his practice and stubbornly attending important Association meetings when his physical strength did not warrant.

A man of comparatively few words, his experience in Association affairs made his judgment of medical policies particularly valuable. Easily approachable, he had a multitude of friends who loved and held him in high esteem. He held the accumulation of this world's goods of little importance. Devoted to his family, fond of his friends, an ardent patriot, ever ready to sacrifice his own interests and convenience to the welfare of his fellow practitioners—who can deny that he found the road to Camelot?

The State Medical Association has lost one of its most valuable and beloved members. His memory will long live in the hearts of his associates.

More About Heat Prostration

THE intense heat of last summer has focused attention on the subject of heat prostration and certain facts have been brought out which should be of value not only in the treatment of this serious condition, but, what is more important, in its prevention. A symposium* on the subject was held last month by the Minnesota Pathological Society from which it seems clear that the explanation of the syndrome produced by excessive heat will be more likely explained by the physiologist than the pathologist. Reports of studies conducted at Boulder Dam have furnished the most valuable material for our understanding of the causes of heat prostration. In 1931 there were 150 cases of heat prostration and seventeen deaths among the laborers at the

Dam. As a result of a study of the subject and remedial measures taken, there were only seven mild cases and no deaths in 1932.

The clinical picture of the patient suffering from excessive heat is not clear cut. The term "heat hyperpyrexia" seems best to designate the patient suffering from excessive heat, be it from the direct rays of the sun or from an excessively hot atmosphere. These people are likely to suffer from premonitory symptoms of lack of appetite or muscle cramp and then present the picture of high fever, dry skin, cyanosis and shock. The nervous manifestations of restlessness, delirium or coma indicate the effect of the disturbance of the brain function; the rapid pulse and low blood pressure are indicative of shock.

In contrast to the above picture some are in shock but have a normal or subnormal temperature and a cold clammy skin. This picture has been termed "heat exhaustion." It is difficult to know in which class many intermediate cases belong.

Among contributing causes of heat prostration may be mentioned a succession of hot days, high humidity, little breeze, improper clothing and dwelling in the city in contrast to the country. Those suffering from cardiorenal disease or who are along in years, are for the most part affected.

Analysis of the pathologic findings at death fails to throw much light on the cause of death. Noble* described wet brains, fatty livers, terminal pneumonias and a generalized vascular dilatation in all the organs.

Rather must we turn to the physiologists for an explanation of heat prostration. A constant temperature is maintained in the human organism by peripheral nerve control and by a center in the region of the hypothalamus of the brain. Excessive heat promotes perspiration and the latent heat of evaporation of the sweat cools the blood in the dilated blood vessels of the skin. The quarts of water lost to a laborer in an excessively hot dry atmosphere have to be replaced. Along with the sweat, salt is lost and unless additional salt is added to the diet in considerable amount the symptoms of heat exhaustion are liable to occur. It is this disturbance of the distribution of the sodium, potassium and the chlorides which plays an important part in the clinical picture. Probably as important a factor is the insufficient blood volume resulting from

*Symposium on Heat Exhaustion; Neurological symptoms, Dr. Royal C. Gray; Mineral and water balance, Dr. Irvine McQuarrie; The changes found at postmortem, Dr. John F. Noble; Mechanisms of heat regulation, Dr. Maurice B. Visscher.

lack of water and dilated blood vessels. Peripheral resistance is lowered and the heart lacks sufficient blood volume to work efficiently. Although such a patient may appear to be suffering from a plethora because of his cyanotic appearance, the opposite is true.

Briefly then, the following treatment is indicated. The patient presenting the picture of heat hyperpyrexia should be cooled by wrapping in a wet sheet and applying ice packs. Fluid and salt should be given in the form of from 1,000 to 2,000 c.c. of normal saline solution intravenously. Intravenous glucose to the amount of 1,000 c.c. of five per cent concentration is also desirable. For the patient presenting the picture of heat exhaustion with a cold clammy skin and a subnormal temperature, liquids and heat rather than cold are indicated.

We know of no better example of the greater value of prevention compared with cure, than in heat prostration. The provision of plenty of water, additional salt, light clothing, proper housing to assure rest and relief from excessive heat, light diet, avoidance of alcohol and excessive smoking are all important, to say nothing of the early detection of signs of heat prostration.

Status of Picrotoxin

The Council on Pharmacy and Chemistry reports that Picrotoxin, which is an extremely active poison, has long been proposed for use in a variety of conditions, including poisoning with chloral hydrate; but a wide experience has always resulted in its falling into practical disuse. Calling attention to the recent work of Maloney and others indicating that picrotoxin may have a certain value in combating the acute toxic effects arising from overdosage with barbital and its derivatives, Eli Lilly & Co. asked the Council to consider Ampoules Picrotoxin (Lilly) for admission to New and Non-official Remedies as an agent for use in this condition. The Council is, however, convinced that the evidence now available for this use does not justify the placing of a marketed product in the hands of the general practitioner irrespective of his facilities for using it with the greatest benefit to his patient, for determining its therapeutic value and contributing the evidence in a satisfactory way. When informed for the Council's attitude in the matter of offering picrotoxin to the general practitioner, Eli Lilly & Co. announced its intention of withdrawing its Picrotoxin Ampoules from the market. The Council desires to express its appreciation of this enlightened action on the part of the firm and to voice the hope that other manufacturers of pharmaceuticals will refrain from making picrotoxin generally available until competent investigators have cleared up the questions of its safety and clinical effectiveness.—(J.A.M.A., Aug. 1, 1936, p. 354.)

OF GENERAL INTEREST

Dr. A. L. Pertl, formerly of Windom, has moved to Canby, Minnesota, where he is associated in practice with Dr. L. J. Holmberg.

* * *

Dr. Ralph M. Tovell, formerly with The Mayo Clinic, Rochester, is now Chief Anesthetist at the Hartford Hospital, Hartford, Connecticut.

* * *

Dr. Leo R. Prins, Saint Paul, and Charlotte Leona Molstad, Minneapolis, were recently married and are at home at 231 Dayton Avenue, Saint Paul.

* * *

Dr. J. S. Kilbride has disposed of his practice at Canby, Minnesota, and is now associated with his son, Dr. E. A. Kilbride, at Worthington, Minnesota.

* * *

Dr. Jerome F. Smersh of Owatonna received his formal award of membership in the American College of Surgeons at the recent meeting held in Philadelphia.

* * *

Dr. P. C. Petersen, who has practiced at Ogilvie, Minnesota, the past two years, has moved to Braham, Minnesota, where he will be a member of the Braham Hospital staff.

* * *

Dr. Henry E. Michelson of Minneapolis has been invited to address the Milwaukee Dermatological Society on the subject of tuberculosis of the skin at the November meeting.

* * *

Dr. Porter P. Vinson, formerly of the Mayo Clinic, Rochester, has opened an office at 300 Medical Arts Building, Richmond, Virginia, for the practice of internal medicine, bronchoscopy, esophagoscopy and gastroscopy.

* * *

On October 18, 1936, St. John's Hospital, Saint Paul, celebrated its twenty-fifth anniversary with appropriate ceremonies. Dr. F. J. Plonske has been medical director and Miss Magdalena M. Ran, superintendent, since its founding.

* * *

Dr. F. W. Behmler, who has practiced in Appleton, Minnesota, for the past twelve years, has moved to Morris, Minnesota, where he will be associated with Dr. C. E. Caine. Dr. Behmler will specialize in surgery in his new location.

* * *

Announcement has been made of the marriage of Miss Sadie Mayal of Hibbing, Minnesota, to Dr. Robert Grau of Saint Paul, which took place November 6 in Minneapolis. Mrs. Grau, before her marriage, was supervisor of the women's medical ward at the Ancker Hospital, Saint Paul.

Dr. John Earl, Saint Paul, began the practice of surgery and obstetrics in May, becoming associated with his father, Dr. Robert Earl of the Earl Clinic. Following graduation from the Harvard Medical School, Dr. Earl interned at Bellevue Hospital, New York City, and at the Boston Lying-in Hospital.

* * *

Dr. and Mrs. Horace Newhart of Minneapolis have returned from a two months' vacation in Europe. While in Germany Dr. Newhart attended the Third International Oto-Rhino-Laryngological Conference in Berlin, as a delegate of the American Otological Society and the American Laryngological Association.

* * *

Dr. William P. Sadler was elected president of the Northwestern Hospital staff, Minneapolis, for the ensuing year at the annual meeting of the staff on October 13. Other officers named are: Dr. William A. Hanson, vice president; Dr. Donald Daniel, secretary-treasurer, and Dr. A. E. Benjamin and Dr. C. B. Wright, executive committee members.

* * *

Dr. William P. Finney of Rochester was elected president of the Alumni Association of the Mayo Foundation at the annual meeting held in Rochester the first of November. Dr. James M. Hayes, Minneapolis, is first vice president; Dr. E. E. Larson, Los Angeles, second vice president; Dr. J. Richards Aurelius, Saint Paul, secretary; and Dr. L. E. Prickman, Rochester, associate secretary and treasurer.

* * *

The marriage of Dr. A. Russell Aanes, son of Dr. and Mrs. A. M. Aanes of Red Wing, and Miss Irene Lucille Persgard of Duluth, took place Saturday, September 26, at the home of Dr. P. C. Benton, Minneapolis. Mrs. Aanes is a graduate of the University of Minnesota School of Nursing and Dr. Aanes is serving his internship at General Hospital in Minneapolis. Dr. and Mrs. Aanes are at home at 507 East Fourteenth Street, Minneapolis.

* * *

Dr. Maurice B. Visscher has been appointed professor of physiology and head of the department at the University of Minnesota. Dr. Visscher received his M.D. and Ph.D. degrees at the University of Minnesota. During the years 1925-1927 he had a National Research Council Fellowship in the Medical Sciences at University College, London, and the University of Chicago. Since then he has headed the department of physiology at the Universities of Tennessee, Southern California and Illinois.

* * *

Dr. G. B. Weiser, of New Ulm, was honored at a testimonial banquet last month given by the members of the Redwood-Brown County Medical Society.

Dr. Weiser has practiced medicine in New Ulm for more than forty-three years. After graduating at Jefferson Medical School in 1879 he practiced for fourteen years in Pennsylvania before coming to New Ulm

in March 1893. Since that time he has practiced continuously in New Ulm and has earned the respect and esteem not only of his fellow citizens but of his fellow practitioners, testimony to which was given in brief addresses by members of the society on the occasion of the banquet.

* * *

The Medical Library Association at its annual meeting in Saint Paul, June 22, 1936, passed resolutions calling attention to the fact that during the past three years the appropriations for the Library of the Surgeon-General's Office (Army Medical Library) have been wholly insufficient to allow the purchase of current medical books and periodicals for the maintenance of the library in its preëminent position as the greatest in the world. After three years' delay volume one of the fourth series of the Index Catalogue of the library has appeared, the delay having been due to insufficient funds. The Medical Library Association, realizing the importance to the medical profession, urges doctors to write their congressmen urging sufficient appropriations at the coming session which opens in January.

BCG as a Tuberculosis Preventive

There are a number of reasons why the use of the living vaccine known as BCG, twelve years after its first use in France, should still be discussed and debated among those concerned with the prevention and cure of tuberculosis. It has never been conclusively demonstrated that the use of this vaccine is an effective means of preventing human tuberculosis. The greatest value of BCG is in cattle, but, in view of the variation in reported results, one could scarcely conclude that it is justifiable to use it universally in man. Experiments in animals have shown little value for the oral method as a means of prevention. The subcutaneous method and the intracutaneous method are variable in their results in animals. The intravenous method of vaccination has proved to be the most efficacious in cattle, although this also varies within wide limits. The greatest difficulty has been to determine how long the period of increased resistance lasts. This also apparently varies in many instances and is often of short duration; that is, under one year. Many different cultures of BCG have been sent to the United States in the hands of various persons, laymen and physicians alike. Different workers have used cultures obtained at different times from the French laboratories. The result is variation in the experimental work that has been carried on, for little has been done to check to the constancy of the characteristics of these strains. The results of these studies have been published from time to time. They are among the best attempts in the world at adequate control comparisons, but one can only conclude, after studying them, that they do not provide conclusive evidence for general use of the vaccine. Sufficient arguments can, however, be presented for the use of this vaccine in groups for which little can be done by other methods, as, for example, the Negroes in the South and the Indians on the reservations, where the present machinery is not adequate in view of the peculiar circumstances surrounding their condition. That there is no conclusive proof of the efficacy of the vaccine in man is in part due to the short duration of the experiments and to the small number of those involved in the carefully controlled experiments as well as to the inadequacy of the accurate data on the control groups.—(J.A.M.A., July 11, 1936, p. 132.)

In Memoriam

Michael H. Egan

1865-1936

DR. M. H. EGAN was born on a farm near Rogers, Minnesota, in 1865. He graduated from Hamline Medical College in 1886 and served his internship at St. Cloud. The following year he acted as a railroad physician for the road being built from Saint Paul to Winnipeg.

In 1889 Dr. Egan located at Hetland, South Dakota, but moved to Sioux Falls, South Dakota, in 1904, where he rounded out nearly forty-seven years of general practice. He was a member of the South Dakota State Medical Association and the American Medical Association. His death occurred at Evanston, Illinois, April 26, 1936.

Dr. Egan is survived by his widow, two sons, Dr. E. M. Egan of Chicago and F. H. Egan of Evanston, a daughter, Mrs. D. L. Moberg of Evanston, and one sister, Mrs. J. P. Flynn of Rogers, Minnesota.

David Simon Fleischhauer

1877-1936

DR. DAVID S. FLEISCHHAUER of Wabasha was born at Kitchener, Ontario, January 27, 1877. His early education was received in Reed City, Michigan, where he graduated from high school in 1894.

He attended college at the University of Michigan and later obtained his M.D. degree at Cornell in 1899, taking postgraduate work at the Eye and Ear Infirmary, Maternity Hospital and Governor Hospital, all in New York City.

Dr. Fleischhauer began practice in New York City but after a year returned to Reed City, Michigan, where he practiced until 1910 and then moved to Wabasha, Minnesota.

On December 24, 1906, Dr. Fleischhauer was married to Isabella Booth of Reed City. She and two children, Katherine Elizabeth (Mrs. J. M. Evans of Wabasha), and David Booth, a student at Carleton College, survive him.

Dr. Fleischhauer was mayor of Wabasha in 1918 and served as a Lieutenant in the Medical Corps of the Army in 1918 and 1919. He was president in 1916 of the Wabasha County Medical Society, which he joined in 1910. He was a 32nd degree Mason, holding membership in the chapters at Winona, Lake City, and Saint Paul. He was a member and past president of the Lion's Club of Wabasha, a member of the Eastern Star and the American Legion. He had been a member and trustee of the First Congregational Church of Wabasha for years.

Dr. Fleischhauer's death from pneumonia occurred on

October 14, 1936. All the physicians in the county acted as honorary pall bearers and in addition Dr. Tenney of Alma and Dr. Hallenbeck of Rochester. A Guard of Honor from the American Legion and the Mayor and Aldermen of Wabasha attended the funeral.

Wabasha has lost a prominent citizen and the profession one of its most valued members. Dr. Fleischhauer was an outstanding example of a fine type of physician, ever ready when his professional service was needed and active in the civic affairs of Wabasha.

L. D. Hughes

1888-1936

DR. L. D. Hughes, Minneapolis, died suddenly at his office in the Medical Arts Building Friday, October 23, 1936, at the age of forty-eight.

Dr. Hughes was born at Carbondale, Illinois. He was graduated from the University of St. Louis medical school and began practice in Minneapolis in 1919.

During the World War Dr. Hughes was a lieutenant in the medical corps and was attached to the 135th infantry. He was a major in the 135th infantry in the National Guard.

He was a member of the Hennepin County Medical Society, the Minnesota State Medical Association, the American Medical Association. He also was a member of the Minneapolis Athletic Club and the Minneapolis Automobile Club.

Dr. Hughes is survived by his wife; two daughters, Elsie Claire and Lois; a son, David; and his mother, Mrs. William Trail of Carbondale.

A. A. Laurent

1882-1936

DR. A. A. LAURENT, Minneapolis, died October 21, 1936, after a short illness.

Born at Hamel, Minnesota, Dr. Laurent had resided most of his life in Minneapolis. He attended the public schools in Minneapolis and graduated from the University of Minnesota medical school in 1911. He took postgraduate work at the Mayo Clinic, Rochester, and in Chicago. He went abroad for further study.

Dr. Laurent was a member of the Hennepin County Medical Society, and was on the medical staff of St. Mary's, St. Barnabas, Northwestern and Deaconess hospitals.

Dr. Laurent's father was also a physician, having received his education in France, but having practiced for fifty years at Hamel. Dr. Laurent's wife died last March. He is survived by two brothers, Albert Laurent of Minneapolis and Emil Laurent of Hamel, and three sisters, Mrs. Josephine Hamel of Hamel, Mrs. Emily Gagne of Minneapolis, and Mrs. Virginia Snow of St. Louis Park.

Harper M. Workman

1855-1936

DR. HARPER M. WORKMAN was born May 14, 1855 in Circleville, Ohio, the son of Daniel and Virginia McWorkman. In 1857 his family moved to Keosauqua, Iowa, where most of his childhood was spent. He received his general education in the local schools and his professional training from Chicago Medical College—a part of Northwestern University. After his graduation in 1878 he entered the employ of the surgical department of the Chicago & Northwestern Railway and later was sent to Sleepy Eye, which was the division point of the Northwestern at the time. In 1883, when the division was moved to Tracy, he established himself there and served as division surgeon until the time of his death.

In 1886 he was married to Nellie M. Gleason, to which union was born one son, Warner Gleason Workman. Mrs. Workman preceded him in death in 1910.

He was the first mayor of Tracy, president of the school board for over 20 years, a member of the Tracy volunteer fire department for over 35 years, secretary of the Lyon-Lincoln Medical Society for long periods, a number of the American College of Surgeons, president of the Minnesota State Medical Association and president of the Council of the State Association at the time of his death.

He was a member of the Tracy Masonic Lodge number 155, of Bower Chapter number 44 and of Marshall Commandery. He was one of the charter members and the first patron of Virginia Chapter O. E. S., and his mother, for whom the Chapter was named, was its first matron.

One of the charter members of the Kiwanis Club, he was, perhaps its most loyal member, never missing a meeting if he was physically able to attend. For many years he had been its secretary.

An American with his ancestral roots firmly established in Colonial soil, he was deeply and ardently proud of the record of his family through many generations in the defense of their country. Although he himself was barred from military service by his age and health, in both the Spanish American and World Wars, he gave without remuneration unstintingly of his time and strength in office work for his government.

The same dauntless spirit which carried him on horseback to the railroad construction camps between Sleepy Eye and Pierre and through blizzards across the roadless prairies in his early days in Minnesota, took him to his office daily, when a less courageous man would have been bedfast. He doggedly clung to life and its activities until death quenched his brave spirit.

Through his long life he has been the staunch friend of the young people, several generations of whom have found in him an advisor who understood and sympathized with them in their troubles and rejoiced with them in their happiness, who was tolerant of their failures and proud of their successes.

In his passing, Tracy loses one of its most picturesque and lovable pioneers—a man whose unflinching code of uprightness and loyalty to his principles

was never swerved by motives of self interest. He spoke his convictions fearlessly and lived them unflinching.

The treasure he laid up for himself and his family was not material but the love of a host of friends and a life filled with love, kind deeds, sympathy and understanding.

His body was escorted from the home to the Masonic Temple by a guard of honor of the Knights Templar, the local Masonic lodge, and a large number of honorary pall-bearers. The services at the Temple were conducted by the Marshall Commandery, with Mr. C. G. Porter Acting Commander. Responding to his request made about a year ago, Dr. O. J. Hagen of Moorhead gave his funeral oration. Dr. Hagen wore the cap and gown of the American College of Surgeons, of which group he and Dr. Workman were members. He was laid to rest in the Tracy Cemetery, where the last rites were conducted by the Tracy Masonic Lodge, Past Master Starr presiding.

Out of town relatives attending the funeral were Mr. Morris Workman, a brother, of Minneapolis, Dr. and Mrs. H. A. Tarbell, brother-in-law and sister, and their son and daughter-in-law, Dr. and Mrs. Gleason Tarbell of Watertown.

Honorary pall-bearers were Drs. W. W. Will of Bertha, W. A. Coventry of Duluth, S. H. Boyer of Duluth, J. M. Hayes of Minneapolis, E. J. Simons of Swanville, W. L. Burnap of Fergus Falls, B. S. Adams of Hibbing, E. A. Meyerding of Saint Paul, E. T. Sanderson of Minnesota, L. L. Sogge of Windom, B. J. Branton of Willmar, W. D. James of Tracy, J. T. Christion of Saint Paul, F. J. Savage of Saint Paul, and Mr. Manley Brist of Saint Paul. Other doctors accompanying the body to the Temple were Doctor Johnson, Patterson, Bolyn, Hauge, Scofield, Chesley, Homberg, and McKeown.

Kaiseraire Filter Ventilator Not Acceptable

This ventilator, manufactured by the H. S. Kaiser Co., Chicago, is marketed under the claim that it removes the "pollen that causes hay fever" and retards and prevents various diseases by "preventing germs from entering the rooms and offices in which people live and work." The filter mat is arranged in layers so that air, laden with dust and pollen, in order to pass through the filter has to travel in a zigzag manner. The filter mat is very heavily coated with a thick, very pungent oil, to which the dust and pollen particles are expected to adhere. Air is forced through by means of two fans of the ordinary blade type. The pollen counts indicate a percentage of efficiency for this filter which may afford the mildly sensitive hay fever subject some freedom from symptoms but they indicate inadequateness of the filter for the severe type. The filter would be ineffective in localities where very highly antigenic pollens are found. In the opinion of the Council on Physical Therapy, the Kaiseraire Filter Ventilator does not possess adequate efficiency for removing pollen from the air; the volume of air it displaces is insufficient for comfort, and the presence of a pungent, penetrating odor is considered objectionable and possibly harmful to sensitive individuals. Therefore the Council on Physical Therapy voted not to include the Kaiseraire Filter Ventilator in its list of accepted devices.—(J. A. M. A., May 16, 1936, p. 1731.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

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House of Delegates: Special Meeting

THE first special meeting of the House of Delegates ever to be called in Minnesota is about to convene as this issue goes to press.

The principal issue before the delegates is not new. Medical care for the indigent and those in the low income group has been the subject of conference, negotiation (often futile) and public scandal for many years.

Unique Opportunity

The opportunity to introduce fundamental reforms that will be uniform for every county in the state, however, has never presented itself before.

Two separate state bodies are now studying the situation with a view to introducing uniform handling of all relief and welfare activities of the state. One of them, the Interim Committee of the Legislature, will take final action directly after election on recommendations made to it during the last few months.

Medical care bulks large in all relief, welfare and social security programs, so-called.

To be Presented to the Interim Committee

Principles which should be established in the law for proper handling of medical care for all the needy and also for recipients of all social security benefits should be definitely enunciated by the House of Delegates. They will be presented to the Interim Committee within the week and will be before that Committee as it shapes legislation.

Planning Board at Work

At the same time, an advisory committee to the State Planning Board is also engaged in making a general survey of relief and welfare needs in Minnesota. This committee, with federal money to finance it, will make its report to the planning board and thence to the governor

for whatever action he may see fit to suggest to the legislature.

It is gratifying to note that representation of the state medical association on this latter committee was asked by the Board. Dr. O. E. Locken, Crookston, speaker of the House of Delegates, and Dr. W. A. Coventry, Duluth, past president of the association, were appointed and are meeting regularly with the committee.

Thanks to Dr. J. L. McLeod, Grand Rapids, state senator and member of the Interim Committee, the interests of the physician and the patient (their interests are necessarily identical) will be ably defended in the other body.

"Our Chance"

All medical phases of the social security program, including medical care for recipients of Old Age Assistance, future developments in unemployment insurance and the public health provisions of the program generally must be considered by the delegates.

The call of president W. W. Will, of Bertha, went out to delegates, committee chairman, officers and other leaders, October 13.

Said President Will:

This is our chance to introduce into this new legislation a uniform and sound system of medical care for the needy of the state. It is as important to the public welfare and the medical profession as the Basic Science legislation of 1927.

Co-operative Commonwealth

From a recent *New York Times Magazine* story on Coöperatives:

"Long before the recent converts (to the coöperative movement) began showering publicity on consumer co-operation, it was being practiced quietly and undramatically in Minnesota and Wisconsin by farmers of Scandinavian origin."

"This has alarmed private business," says the *Times*, "which sees in Minnesota, Wisconsin and the surrounding states things reminiscent of what happened decades ago in England and Sweden where today consumer coöperatives do 40 to 50 per cent of the business in

certain lines. *How far, then, has this movement progressed in Minnesota, the Nation's most coöperative state? And what are its ultimate objectives?*

"Co-operative Medical Offices"

"To find out one journeys to Minnesota, buys apples at a little country coöperative grocery, fills his gas tank at coöperative service stations, wanders through huge coöperative warehouses and creameries, talks over coöperative telephones, reads coöperative newspapers, visits well-furnished *coöperative medical and auditing offices*, sleeps in a coöperative boarding house, eats in a coöperative cafe, sends linen to a coöperative laundry, reads tombstones in a coöperative cemetery. And one ends up by being a trifle amazed." . . . (Italics and titles are ours.)

A Trifle Amazed

The reader from Minnesota is also a trifle amazed. He suspects that the *Times* correspondent was enlarging a little on the facts to make a story.

At the same time, the threat or hope, according to your own bias, of a coöperative commonwealth comes increasingly closer.

New Dealers are publicly interested in coöperatives and government money has been spent under the Resettlement program to subsidize certain consumer coöperatives. Churchmen are interested.

Pocketing Profits

If the movement is successful on a big scale in America, political economists declare that it will not be confined to the retail coöperatives.

Says Government Bulletin No. 598 issued by Isador Lubin, commissioner of the Bureau of Labor Statistics:

"The average working man who joins a retail coöperative thinks only of saving for himself the retailer's small profit. He does not take due account of the fact that retail coöperative societies unite to form wholesales and that these wholesales go into manufacturing and the production of raw materials and that the great coöperative movement of the world is moving to put into the pockets of consumers that vast fund known as the profits of business. This is known to be a concrete fact in those countries where a large part of the people supply their needs through their coöperative societies."

Medical Needs Next

It goes without saying, of course, that the "great coöperative movement of the world" will move on to include medical care among the needs that coöperative societies will try to supply.

How does business feel about it? Will it suc-

ceed? These are important questions to the doctor.

J. T. Meek writing in the *Illinois Journal of Commerce* makes several observations which apply to professional services as well as to business:

"Business Must do a Better Job"

"Business cannot beat the coöperatives," he says, "by holding up the shining light of the functions of private enterprise over the century. It cannot beat it by damning it. On the contrary that is the surest way to make it grow.

"It can beat the coöperative, primarily, by doing a better job of distribution than the coöperatives are doing. . . .

"It will be a sad mistake if certain lines of business feel that they are free from the threat of the consumer coöperative because they are big; because they are in metropolitan centers; or because they deal in style, drugs, cosmetics or otherwise highly specialized lines. As coöperative communities grow in size, advances into these fields may be expected.

Here to Change Things

"The coöperative is here to change things and whether it will live because the business world refuses to accept the challenge or die because the business world accepts it is up to business itself."

* * *

There are no well organized functioning medical coöperatives in Minnesota—yet, the *New York Times* story notwithstanding.

One northern Minnesota society is just now taking steps to change its charter, however, so that it may organize any "needed services" on a coöperative basis. There is talk.

Organized Medicine will not be able to beat medical coöperatives, either, by damning them.

Field Army for Cancer

A new campaign for popular education about cancer is about to be launched in Minnesota with the approval of the Council of the Minnesota State Medical Association and the Cancer Committee.

It is to be carried on by a Women's Field Army organized by the American Society for the Control of Cancer at the original suggestion of the Federation of Women's Clubs.

Cancer Committee Consulted

The Field Army program was brought before the Cancer Committee, of which Dr. Martin Nordland of Minneapolis is chairman, at a recent St. Paul meeting. Plans were laid where-

by the women, assisted by the physicians, will carry on a extensive campaign of education in Minnesota.

The Army, itself, is organized military fashion under a state commander, Mrs. Harlow Hanson of Minneapolis, health chairman of the Minnesota State Federation of Women's Clubs. Under Mrs. Hanson are captains and other officers, a state division composed of representatives of all state women's organizations, local units and local chairmen and officers.

Organization

The whole is under the supervision and direction of the state chairman of the American Society for the Control of Cancer, Dr. W. A. O'Brien, of the University of Minnesota, an Executive Committee composed of members of the state medical association's Cancer Committee and a state advisory committee composed of the state chairman and executive committee and other influential and interested individuals. This state advisory committee will meet annually or semi-annually and assign special problems brought to it to special sub-committees to handle.

The activities so far specified include mass meetings, lectures, radio broadcasts, newspaper and magazine articles, exhibits, distribution of literature.

To Dispel Fear

The object is to dispel cancer fear and to bring a message of hope, particularly to American women.

Members of the Cancer Committee expressed a cordial interest in the project, promised their active interest and support. The headquarters of the state medical association, at the behest of the committee, will extend every possible assistance to the Field Army and its commander, whose immediate objective is, of course, the complete organization of the women of the state.

The committee will write to medical society secretaries all over the state for a list of competent local speakers on the subject.

Best Defense

It has long been recognized by medical society officials and public health authorities that the cancer situation might at any time afford a pretext for the inauguration of state services for detection and treatment.

Whole-hearted backing and assistance for a

well organized popular movement for the early detection and proper treatment of cancer is the best possible defense against unwarranted establishment of state medicine for cancer victims.

The interest of organized medicine in cancer is not confined to its strategic importance to the public policies of medical societies.

Cancer Exhibit

An important section of the scientific exhibit section of the 84th Annual Meeting of the Minnesota State Medical Association to be held in St. Paul in May is to be devoted to cancer. Plans for the exhibit were shaped at the same committee meeting. Dr. H. E. Robertson of Rochester is to be in charge and doctors who attend the meeting are to be invited to submit sections for examination and discussion of the exhibit by pathologists.

An unusual cancer exhibit will feature the scientific exhibit section of the 84th Annual Meeting of the Minnesota State Medical Association at the St. Paul Auditorium May 3, 4 and 5.

Attending physicians will be invited to bring in specimens and sections for examination, diagnosis and discussion by pathologists at the exhibit booth.

The exhibit will be staged under the direction of Dr. H. E. Robertson of Rochester, exhibit chairman, Cancer Committee, Dr. O'Brien and Dr. Martin Nordland of Minneapolis.

Success in Defense

(Monthly Editorial by the Medico-Legal Advisory Committee)

Recent cases in our state illustrate various phases of the work of your Medico-Legal Advisory Committee and the excellent spirit of co-operation which is beginning to invade the ranks of the thinking members of our society. For instance:

(1) A physician of middle age was sued by a patient because of alleged unskillful handling of a fracture case. He was not a member of our society nor did he have insurance. The members of the county society interested themselves in his trouble because they were fearful of the reaction on the medical profession through an adverse decision. They attended court, testified in his behalf, and assisted his defense in every honorable way. Result: a verdict for the doctor

and a cementing together of the profession in that locality.

(2) Several members of a county society were sued because of alleged negligence in performing an abdominal operation. The patient was seen by a member of the society who made unprofessional and unethical remarks. Suit was started. This member then testified for the plaintiff. Result: verdict against the doctors for several thousand dollars; the immediate raising of premiums of all members carrying insurance in the indemnifying company in this state; and a threat by this company to withdraw from the county involved. If they do, it will leave many members without insurance protection.

(3) A member was sued for alleged malpractice following an automobile accident. Insurance company was notified; your committee was not notified because of the defendant's feeling of reluctance to let outsiders know of his troubles. Case (justifiable or unjustifiable) was settled by the insurance company, and another black spot entered on the insurance companies' books because the member did not feel the spirit of co-operation.

It is certain that no one is above censure for poor work or neglect of a case, but certainly all should not pay increased premiums because of the wish of a member to hide, because of false modesty, behind an unjustifiable settlement.

(4) A prominent member of our society was sued because of alleged mistreatment of a leg condition. He followed out the usual procedures recommended by the committee—insurance representatives consulted by the committee, defense properly lined up, members of the society in attendance at Court, testimony given by prominent members of the locality. Result: complete exoneration by jury of any wrong practice and the dignity of the profession upheld.

In defense of these cases your committee should be consulted at once by sending in your card to the office of the State Association. The customary procedure outlined by the committee will then be carried out in the members' behalf. Proper cases, after investigation, will be assisted and the unfortunate results in many suits in the past eliminated.

The Medico-Legal Advisory Committee believes that success in defense lies in coöperative effort. That which concerns one concerns all.

"Siren Song"

From a recent address by Dr. Floyd S. Winslow, president of the Medical Society of the State of New York:

"The advocates of socialized medicine lure the profession with the siren song of bureaucratic jobs, assured income—security—false security. We do not want to be secure. We want to remain insecure. We want to continue to be required to give our very best to every patient or lose out in the gentlemanly competition which exists within our ranks. This is an incentive that operates to our insecurity but to the security of the patient. We prefer the discipline of private practice which keeps us on our toes, to an assured income under bureaucratic control where our highest ambition is more likely to be to keep ourselves solid with the politicians who have taken over the job of running our profession."

For Insecurity

"I repeat, security for the doctor means insecurity for the patient. . . ."

"And it cannot be too emphatically put that it is incumbent upon us . . . to prevent those whose occupation it is to *talk* about medical care, from inaugurating visionary proposals tending to prevent us, whose occupation is to *provide* medical care, from keeping faith with our patients and with the public. We have been accused of thinking only of our bank accounts when we oppose compulsory health insurance. When did we ever think only in terms of our banks accounts? Where is there another profession which is so impersonal in its primary objects, working so surely, and so effectually, fighting every kind of disease, driving out of existence, if it were possible to do so, the very source of our income?"

Dr. Winslow's address was printed in "Vital Speeches of the Day" published by the City News Bureau of New York City. The New York State Society is now carrying, with great success, its campaign to prevent legislative interference with the private practice of medicine to the newspapers, periodicals and the public platform.

Philadelphia Emergency

Administration of medical relief has reached a turning point in many parts of the country.

The Commonwealth of Pennsylvania abruptly ceased to issue medical orders for persons on relief on September 25.

The Board of Directors of the Philadelphia County Medical Society accordingly took immediate action to assume responsibility on behalf of its members for providing medical care to the

needy of Philadelphia from September 25 to December 31, 1936.

During the three month period thus provided, the society will make every attempt to set up an equitable plan under which patients on relief may be cared for and necessary funds may be allocated from city, state or private philanthropy to maintain the plan.

Inquiries have been sent to many state and county societies throughout the country for information that might be of assistance in formulating plans for Philadelphia. The indication is that Philadelphia physicians are interested in the possibilities of a scheme for payments by lump sum to the county society which will in turn be pro-rated to members or put into a common fund.

Johnson Memorial

The Herman M. Johnson Memorial Fund is growing: Total received to date, \$1,495.95.

Most interesting among recent contributions were those received from county societies as a whole. Renville County Medical Society contributed \$42 from its members; Winona County Medical Society, \$26.

The largest contribution from an individual to date is \$100; the smallest, one dollar.

The objective set by the committee is a fund of \$2,000. The fund will be used mainly to establish a lectureship in economics as they affect medicine at the University of Minnesota. The first lecture will be held this winter, the committee hopes.

Wanted: C. C. C. Doctors

There are almost continuous vacancies for young medical men in Civilian Conservation Camp work in the Minnesota-North Dakota District.

Lieutenant Colonel J. W. Sherwood, Medical Corps, Fort Snelling, is district surgeon in charge of the work. Colonel Sherwood and the Surgeon of the 7th Corps Area at Omaha have both asked all medical publications in this district to inform physicians of the fact.

The reason for frequent vacancies lies in the fact that many of the younger men accept the appointments and remain on duty only until they

have saved enough money to go into private practice.

The usual procedure requires that appointments be made from the ranks of Medical Reserve Officers below the grade of Major. Special arrangements can be made, however, for any physician under the age of 35 to be furnished a reserve commission in the grade of first lieutenant. A contract can be given him immediately on a full time basis while action is pending on his application for commission.

There are three vacancies in the Corps at the present time, according to Colonel Sherwood, and several more are expected in the near future.

Minnesota State Board of Medical Examiners

Self-Styled "Specialist" Pleads Guilty

Re: State of Minnesota vs. Francis Howard Punchard, Sr., alias, J. Francis Clark

After spending thirty-three days in the Minneapolis City and County Jail, Francis Howard Punchard, Sr., alias J. Francis Clark, fifty-six years of age, entered a plea of guilty to an information charging him with practicing healing without a basic science certificate. This plea of guilty was entered on October 5, 1936, before the Honorable W. C. Leary, Judge of the District Court.

Punchard, who holds no license to practice medicine in the State of Minnesota, nor in any other state, was arrested on September 2, 1936, in Minneapolis following an investigation conducted by the State Board of Medical Examiners. This investigation disclosed that Punchard had been to a number of homes in Minneapolis where he posed as a skin and cancer specialist and obtained money from a number of patients. When Punchard was arraigned in Court on September 3, 1936, his bail was set at \$2,000, which he was unable to furnish. Subsequent investigation disclosed that Punchard had also called on several patients at Cokato, Minnesota, where he had obtained at least \$100 for his services.

From 1916 to 1924 Punchard maintained an office in Minneapolis where he represented himself to the public as a physician and surgeon. He had no license at that time and was warned by the Minnesota State Board of Medical Examiners to cease practicing. He left the State of Minnesota and has been carrying on his activities in Chicago, Illinois, Madison, Wisconsin, and other places in that vicinity. He was arrested in Chicago and pleaded guilty on October 26, 1932, to a charge of practicing medicine without a license. He was fined and given a jail sentence. Punchard has represented himself on various occasions as being a graduate of Oxford, the University of Maryland and other schools. He has also represented himself as being connected with the Rockefeller Foundation. When in court in Chicago, in 1932, he stated that he had been in this country ten years, having come from England. However, the investigation discloses that Punchard was married in New York City on August 30, 1903.

Following the presentation of the facts to the court, Judge Leary sentenced Punchard to a term of six months in the Minneapolis Workhouse, and he was given one week in which to leave the State of Minnesota. He is not to return to this State for a period of five

years. If Punchard should return or attempt to practice healing in any manner, the stay will be vacated and Punchard will be required to serve the workhouse sentence.

Indian "Doctor" Gets One Year at Hard Labor at Rochester

Re: State of Minnesota vs. Mels White, alias Mike Roller, alias Marion Roller, alias Marion Royle

Mels White, alias Mike Roller, alias Marion Roller, alias Marion Royle, who has represented himself on various occasions as being anywhere from thirty-six to fifty years of age, and who states that he is a full blooded Osage Indian from Oklahoma, but who has spent most of the past ten years in the Wisconsin State Prison, entered a plea of guilty to an information charging him with practicing healing without a Basic Science Certificate on October 8, 1936, before the Honorable Vernon Gates, Judge of the District Court, at Rochester, Minnesota. Judge Gates sentenced White to one year at hard labor in the Olmsted County Jail.



During the past summer White has been operating his swindle in the vicinity of Chatfield, Dover and St. Charles, Minnesota. On May 29, 1936, he called at the home of a seventy-four year old widow in Chatfield, who for some time has been afflicted with Parkinson's disease. He told this lady that he, himself, had been afflicted with this ailment and that he effected a cure in his own case from these medicines that he prepared. He demanded cash in advance and was paid the sum of \$46.55. For this sum of money three bottles of medicine and one bottle of liniment were furnished to the patient and this was supposed to constitute a three months' course of treatment. The patient took the medicine and is in the same condition today as she was before she started the treatment, except that her small savings account shows a little less because of this swindle. The investigation conducted by the Minnesota State Board of Medical Examiners discloses that White fleeced farmers and others in southeastern Minnesota out of approximately \$1,000 and also has obtained approximately \$800 by the same methods in the vicinity of Chippewa Falls, Wisconsin, and has a \$500 bond posted to guarantee his appearance in the Circuit Court at that place on October 20, 1936. White was arrested at Chippewa Falls on September 18 last, and sales slips giving the names and addresses of many of his patients were found in his possession. These slips also showed the amount of money that he obtained in each case.

In 1917 White served 110 days at the Indiana State Farm at Greencastle, Indiana, on a charge of carrying concealed weapons. At that time he was using the name of Marion Royle. In April, 1926, under the name of Marion Roller, he was sentenced to serve one to ten years on a charge of carnally knowing and abusing a female minor. He served seven years, two months and six days in the Wisconsin State Prison on this charge. He was sentenced from Hudson, Wisconsin. In July, 1934, he pleaded guilty to two charges of practicing healing without a basic science certificate at Janesville, Wisconsin. He was fined \$100 or ninety days on each of these charges. On May 8, 1935, he pleaded guilty to a charge of practicing healing without a basic science certificate at Winona, Minnesota, and was fined \$200 or two months in the Winona County Jail. He served the jail sentence.

Unless the present jail sentence convinces White that he cannot get by with this swindle in Minnesota, the

Medical Board will ask that he be prosecuted for obtaining money under false pretenses. Such a charge is a felony and carries a sentence of five years in the State Prison. In the event that White should be convicted under this law his sentence would be doubled because of his previous conviction of a felony in Wisconsin. It is to be hoped, however, that the imposition by Judge Gates of the maximum sentence provided by law for practicing healing without a basic science certificate, may convince White that he cannot get by with his racket in Minnesota. The Medical Board wishes to express its appreciation for the prompt, efficient and courteous cooperation of Mr. Hayes Dansingburg, County Attorney, of Rochester, Minnesota.

Otoflex Not Acceptable

The Council on Physical Therapy reports that the Otoflex, manufactured by the Otoflex Corporation, Milwaukee, is a device for generating tones which are audible within the ordinary sound range. These tones are generated by an electric oscillator making use of vacuum tubes. The frequency of the tones may be changed at will and the volume increased or decreased. An electric motor provides a method whereby the tone may be automatically varied from very low to very high pitch. The sound is applied to the ear by means of telephone receivers. The device was tested in a clinic acceptable to the Council. In this investigation thirty-one persons were treated, twenty-one women and ten men. More than a thousand treatments were given. The results of the investigation were not convincing, since no significant changes in hearing were noted, either for the better or for the worse. In the opinion of the Council, the corresponding changes in hearing would have been noted if the patients had not used the instrument at all. In view of the negative results of the investigation, the Council on Physical Therapy voted not to include the Otoflex in its list of accepted devices.—(J.A.M.A., Aug. 15, 1936, p. 499.)

Antipneumococcic Serum Types I and II Containing Heterophile Antibodies-Lilly Not Acceptable for N.N.R.

In the report of the annual meeting of the Council on Pharmacy and Chemistry for 1935, it was noted that "A pharmaceutical house is marketing an antipneumococcus serum with the claim that the product contains certain 'heterophile units' and 'neutralizing agents' with the claim that these represent advantages over ordinary products of this class. . . . The Council voted that the firm in question be invited to present the available evidence in order that the Council may consider it and report to the profession on the status of such a product in the light of the evidence for the claims made." This action was instituted and the firm, Eli Lilly & Co., submitted its evidence and rationale for promotion of the product. For the purpose of determining the present status of this preparation, the Council requested Dr. Norman Plummer (instructor in clinical medicine, Cornell University Medical College) to make a report on the addition of these immune factors to antipneumococcic serum. The report of Dr. Plummer appears in The Journal A.M.A., Aug. 15, 1936, p. 499. On the basis of this report the Council declared Antipneumococcus Serum Types I and II Containing Heterophile Antibodies marketed by Eli Lilly & Co. unacceptable for inclusion in New and Non-official Remedies because of lack of evidence of its therapeutic value. The Council desires to emphasize the conclusion of Dr. Plummer that, in the light of present knowledge, recommendation of the combined heterophile serum for general distribution is unwise and unwarranted.—(J.A.M.A., Aug. 15, 1936, p. 499.)

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

The Inter-State Postgraduate Medical Association

The annual meeting of the Inter-State Postgraduate Medical Association held in Saint Paul October 12 to 19, 1936, was well attended. Approximately 3,500 registered, 2,500 of whom were physicians. Doctors were present from every state in the Union except Nevada. Besides some fifty-seven doctors from Canada there were four from England and one each from France, Ecuador, Poland and India.

The scientific program was conducted without delay, for which the local committees under the chairmanship of Dr. E. M. Jones deserve the credit.

Officers for 1936-37 are: Dr. Edward W. Archibald, Montreal, and Drs. Charles H. and William J. Mayo, Rochester, presidents of clinics; Dr. William B. Peck, Freeport, Ill., managing director; Dr. Tom B. Throckmorton, Des Moines, secretary; Dr. Henry G. Langworthy, Dubuque, Iowa, treasurer; Dr. Arthur G. Sullivan, Madison, Wis., director of exhibits; Dr. Mather Pfeifferberger, Alton, Ill., speaker of the assembly; Dr. George W. Crile, Cleveland, program chairman.

Trustees, in addition to Drs. Miller, Langworthy, Throckmorton, Sullivan and Pfeifferberger, are: Drs. George V. I. Brown, Milwaukee; John M. Dodd, Ashland, Wis.; Clifford U. Collins, Peoria, Ill.; and John E. O'Keefe, Waterloo, Iowa.

Dr. John F. Erdmann, New York, president-elect, becomes president of the Association for the year 1936-1937 and Dr. Elliott P. Joslin, Boston, is president-elect.

The dinner meeting held Wednesday evening, attended by nearly a thousand members and guests, was presided over by Dr. David Riesman, president of the Association. On this occasion a token of appreciation was presented by the Association to Dr. W. J. Mayo and Dr. Charles H. Mayo. Addresses were delivered by Major General Charles H. Reynolds, Surgeon-General of the Army; Rear Admiral P. S. Rossiter, Surgeon-General of the Navy; Dr. Thomas Parran, Surgeon-General of the United States Public Health Service; Dr. W. J. Mayo; Dr. Charles H. Mayo; Dr. Charles G. Heyd, vice president and acting president of the American Medical Association; Dr. John F. Erdmann, president of the Inter-State Post Graduate Medical Association, and Dr. George Crile of Cleveland.

Minnesota Society of Internal Medicine

The fall meeting of the society will be held at Rochester on November 16, 1936, with the Rochester members acting as hosts to the Society. Dr. Frank J. Hirschboeck, Duluth, is president and Dr. Max Hoffmann, 1232 Lowry Medical Arts Building, Saint Paul, is secretary of the society.

Hennepin County Society

At the annual meeting of the Hennepin County Medical Society held Monday evening, October 5, Dr. J. H. Simons was installed as president for the coming year. Dr. R. R. Cranmer, retiring president, who becomes chairman of the Executive Committee, reviewed the work of the past year, and Dr. Simons outlined plans for the coming year. Other officers are: Dr. F. G. Benn, first vice president; Dr. C. E. Proshek, second vice president; Dr. O. J. Campbell, secretary-treasurer; Dr. T. A. Peppard, librarian.

Dr. Simons announced the following appointments as committee chairmen: Dr. F. G. Benn, first vice president, scientific programs; Dr. C. E. Proshek, second vice president, entertainment; Dr. Gilbert Cotnam, editing and publishing; Dr. S. Marx White, economics; Dr. Ivar Sivertsen, legal; Dr. A. S. Fleming, interprofessional relationships; Dr. C. W. Waldron, University relations; Dr. F. H. K. Schaaf, study of trends in medical practices; Dr. H. B. Annis, historical; Dr. T. A. Peppard, library and house, and Dr. G. D. Eitel, fellowship.

Kandiyohi-Swift-Meeker Society

The Kandiyohi-Swift-Meeker County Medical Society met at the Lakeland Hotel, Willmar, Minn., on October 27, at 6:30 P. M.

Dr. Martin Nordland of Minneapolis was the speaker for the evening, his topic "Practical Points of Surgical Lesions of the Neck." He also discussed points of interest from the clinics he attended on his recent European trip.

The Ladies' Auxiliary met at the same time.

Rice County Society

A meeting of the Rice County Medical Society was held in the Faribault Clinic rooms Thursday, October 1, at 7:45 P. M. Dr. A. W. Adson of Rochester addressed the Society on "The Diagnosis and Surgical Treatment of Spinal Cord Tumors."

West Central Society

Dr. A. L. Lindberg, Wheaton, was elected president of the West Central Medical Society at the regular October meeting of the society. Other officers are Dr. B. V. Bates, Browns Valley, vice president, and Dr. I. L. Oliver, Graceville, secretary.

Upper Mississippi Medical Society

The fall meeting of the Upper Mississippi Medical Society was held at Bemidji, Saturday, October 31, 1936. Dr. W. W. Will acted as master of ceremonies at the banquet in the Markham Hotel. The scientific program was as follows: Dr. O. E. Locken, Crookston, Speaker of House of Delegates, "Will the Gov-

ernment or the Patient Pay?" Dr. L. Strausman (Germany), Rochester, "State Medicine as Seen in Germany." Dr. E. G. Hubin, Deerwood, "Case History Tularemia with Pulmonary Complications." Dr. L. F. Richdorf, Minneapolis, "Mastoids in Children." Dr. Martin Nordland, Minneapolis, "Thyroiditis—Diagnosis and Treatment."

Minnesota Medical Officers Association

The fall meeting of the Minnesota Medical Officers Association was held at the School for Feeble Minded at Faribault on Monday, October 5, 1936.

Dr. A. R. T. Wylie read a paper and presented a clinic on "Feeble-mindedness."

Luncheon was served at the institution. In the afternoon a program was presented by the patients at the school and the Society made an inspection of the institution.

The following officers were elected for the coming year: Dr. D. E. McBroom, president; Dr. (Ethel R.) Beede, vice president; Dr. H. E. Hilleboe, secretary.

WOMAN'S AUXILIARY

MRS. E. M. HAMMES, *President*,
1456 Summit Avenue, Saint Paul
MRS. A. A. PASSER, *Editor, Press and Publicity*, Olivia

Hennepin County

The Woman's Auxiliary to the Hennepin County Medical Society held its first fall meeting Friday afternoon, October 2. The meeting was in the form of a tea and reception for new members and officers at the home of Mrs. Moses Barron, Minneapolis. The outlining of the year's program and a business session, with Mrs. W. Moir in the chair, concluded this part of the afternoon meeting. A most comprehensive year book has been published and each member was presented with a copy.

Musical selections by Mrs. Milch, cellist, Mr. Nicolai Bonelli, violinist, and Miss R. Anderson, pianist, preceded the tea.

New officers included Mrs. W. W. Moir, president; Mrs. Stephen Baxter, president-elect; Mrs. R. R. Cranmer, recording secretary; and Mrs. C. M. Larson, corresponding secretary. Mrs. J. S. Milton is the new press and publicity chairman.

Renville County

The Woman's Auxiliary to the Renville County Medical Society held its annual election of officers last May at the home of Mrs. A. A. Passer. Mrs. E. M.

Hammes, state president, was a guest at the meeting and gave a report of the national meeting held at Kansas City. Mrs. R. C. Adams of Bird Island was named president to succeed Mrs. R. S. Madland of Fairfax. Mrs. G. H. Mesker of Olivia entertained the Auxiliary at her home the evening of October 7. Mrs. George Williamson of Saint Paul was present and outlined the program of entertainment for the Interstate Post graduate Medical Association of North America held in Saint Paul, October 12 to 16.

HERNIATED EMPYEMA OF GALLBLADDER OPENED THROUGH SKIN INCISION

(Continued from page 741)

apex. Because of this condition, steps were taken to remove the patient from St. John's. The pneumonia had apparently cleared up some days before the picture was taken. Frequent questioning of the patient as to whether he had had the cough and expectoration for a long time always brought an emphatic denial. I found out a little later from his wife that he had been coughing and expectorating for three or four months.

The patient was last seen on February 23, and on February 24 was removed to another hospital as a county case, and died two days later. As I was ignorant of his death until after the body had been prepared for burial, I was unable to take advantage of his wife's permission (given a few days before his death, and in expectation of it) to hold a partial autopsy.

As stated before, the patient had undergone an operation twenty-one years ago. The attending surgeon kindly informed me that this was for an acute cholecystitis, and that the gallbladder was drained and three gall stones removed. He had never had any symptoms following the operation until a few weeks before he came to the hospital. The pain under the right costal arch, gradually increasing in intensity, was no doubt due to the gradual filling of the gallbladder with stones. The viscus finally becoming so distended that the portion of it nearest to the middle line (which was the point at which it was adherent to the subcutaneous tissues) pushed through a small post-operative hernia and showed as the mass which I opened. The distance from the tip of the xiphoid to the level of the middle of the protrusion was 3.25 cm. and the distance from the middle line of the abdomen to the middle of the protrusion 3.50 cm. The deepest part of the sac was downward and to the right.

The contents of the bladder were at first largely hydropic, later on becoming more like those of an empyema. The evacuation of the bladder contents, particularly the stones, cleared up the process as was shown by the presence, at the last, of perfectly clear bile and practically no drainage. The wound would undoubtedly have healed had the patient lived a little longer. Sixty stones were removed in all. It is believed that a case just like this (aside from the concomitant conditions) has never been reported, and because of this, it is reported in such detail.

MINNESOTA MEDICINE

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CONDUCT IN MEDICAL PRACTICE*

B. J. GALLAGHER, M.D.

Waseca, Minnesota

PRECEDENT has decreed that the President of this society shall deliver a presidential address on the evening of the annual banquet. The honor of presiding over this society is one which is so deeply felt and so greatly appreciated that it is with a feeling of some trepidation that I attempt to walk in the footsteps of those fine men who have preceded me in this office.

But, unfortunately, presidential essayists can probably lay claim to being the original "forgotten men." Abraham Lincoln may have had presidential addresses in his subconscious mind when he said:

"The world will little know nor long remember what we say here."

In planning an address of any kind one must give some consideration to the question of how long it shall be. No speech is entirely bad if it retains the saving grace of brevity. I have decided that the optimum time is somewhere between ten minutes and half an hour. Even the lawyers have found that there is such a thing as talking too long and the limits which I have established have been founded in part on the experience of one of my brothers who is a lawyer. Some years ago he was appointed by the Judge to appear in court in defense of a prisoner who had entered a plea of guilty to the crime charged. My brother talked very earnestly before the Judge for ten minutes, recounting all the extenuating circumstances that he knew of and pleading for the clemency of the court. When he got through the Judge promptly said, "Ten years in State's Prison." My brother has always contended that if he had talked for half an hour instead of ten minutes, he would prob-

ably have gotten the prisoner a life sentence.

I shall try to stick closer to the ten minutes than the half hour, for if you are to be the judge and jury when I get through, I do not want the sentence to be more than ten years.

Speaking of lawyers, they like to tell stories on the doctors, especially if they have something to do with the matter of the doctor burying his mistakes. There is one burying story, however, which no lawyer ever thinks is funny, and that is about the two men who were walking in a cemetery, one day, when they came to a tombstone on which were engraved these words, "Here lies a lawyer and an honest man." One man turned to the other and said, "How did they happen to bury them both in the same grave?"

It would seem that since we are destined to live out our lives on this earth, if those lives are not to be entirely miserable, we must derive what we can of happiness as we go along. Even the laity agree that the doctor's life is a "dog's life," and yet I doubt if many of us would choose a different course if we had it all to do over again. If we do not expect the compensations to be entirely financial, they more than make up for the factors which so often contribute to our physical discomfort and our mental distress. But I think that, aside from the normal and ordinary things inherent in the work of the profession which make doctors more or less unhappy at times, many of us go out of our way to invite things which bring us nothing but needless unhappiness. Several years ago, after being in the maelstrom of general practice for five or six years, I was away for several months and then returned to practice again. Having in mind some of the things which one might call extra-

*President's address before the annual meeting of the Southern Minnesota Medical Association, Albert Lea, Minnesota, August 30-31, 1936.

curricular, which it seemed to me had contributed needlessly to my own discomfiture and to that of other doctors whom I knew, I wrote down a few postulates which I thought might serve to steer me clear of some of the reefs I had struck before. In looking them over, lately, I notice there are six—what might be called six beatitudes of conduct in medical practice. I have not always lived up to them, and I do not suppose anyone could; but if one did, I believe he would avoid some of the heartaches which we have all felt at times.

1. **"Do not discuss your competitors with ANYBODY. It only leads to acrimony."**

You know how anxious some people are to open up a discussion of this kind which involves criticism of your confreres and how easy it is, by word or by acquiescence, to chime in with it. When we do this we do ourselves and our profession no good and afterward we have that uncomfortable feeling that we have surrendered to expediency and thereby failed to live up to the best traditions of our calling. I think the sum total of our happiness in life will be greater if we make use of such occasions to come to a diplomatic defense of the profession as a whole, for we know only too well that the fortunes or misfortunes of medical practice are often regulated by factors over which we have very little control. The streptococcus is deadly, whether in our competitor's practice or in our own.

2. **"Do not talk too much. Sarcastic remarks do no good and only cause a lot of sorrow."**

They not only cause a lot of sorrow but they actually hurt our business. You know the old saying that politics make strange bedfellows and the man or the family who, today, may not seem to be our friends, in a few years from now, by some turn of the wheel of fortune, may prove to be the best of friends and patients. If we succumb to a natural inclination to be "uppish" with people who employ another doctor when we feel, for some reason or another, that they should have employed us, we not only make ourselves unnecessarily unhappy at the time but we may preclude the possibility of ever doing anything for these people in the future. We contend, in arguing against "state medicine," that people must be allowed "free choice of physician." We must then allow them that privilege freely our-

selves and not feel that we have any counterclaim on them because we may have done things for them in the past.

3. **"Do not try too hard to explain reasons for everything."**

I sometimes think of what people say in referring to some older physician who is dead and gone. They will say that he never said much but that he was a great doctor. He may really not have said much because he did not know much about the matter, but, at least, he knew enough not to try to explain the unexplainable—to "unscrew the unscrutable," as the negro preacher expressed it. I think, in our younger days especially, we often try to explain too much, the net result being further confusion and loss of confidence on the part of the patient and the family. We should oftener remember that we are master of the unspoken word. This is well expressed in one of the epistles of St. James, in which he says:

"We should be quick to hear but slow to speak."

I do not mean to imply that the Sphinx on the Nile would make a great doctor, for the practice of the art of medicine is based in great part on the skillful use of words; but the practice of the science of medicine is seldom, if ever, improved by recourse to verbosity.

4. **"Make the job the main thing while on it and when the necessity for a change arrives, take a vacation away from town."**

The doctors in any small town, practicing alone, as most of us here are, can testify that after a certain number of weeks the long, irregular hours tire our bodies and our nerves and it is then that we get jumpy and irritable and say and do things which do irreparable damage to our business. We try to escape doing certain things which we do not want to do. Someone has said that the "conquest of fate is in acquiescence to it and not in struggling against it," and if we are in general practice it is our fate that we must tend to our business while we are in town, unpleasant or uncomfortable as it may seem. If we think at that time that we cannot afford a vacation, I believe the truth of the matter is that we cannot afford not to take one. In industry the law limits the number of hours which men may work, in the interest of public safety. In medicine we work on indefi-

nately. I suppose the best solution of this problem is group practice, or even a partnership of two men where this can be done. This allows more time for periods of vacation which must, almost necessarily, be away from town and which can often be made to be periods of post-graduate instruction or observation. This will result in a better type of medical service to our patients but particularly, as is the theme of this discourse, will allow us to live a little as we go along instead of always putting it off to that future day when we think we can afford it—a day which may never come for many of us. Without enthusiasm our work becomes drudgery and it is hard to keep enthusiastic when we stay on the job too long at a time without the reviving stimulus of a rest and change of scenery.

5. "Try to avoid hearing the mean things said about you and if heard anyway, try to forget them as soon as possible."

You remember Kipling's words:

"If you can bear to hear the words you've spoken
Twisted by knaves to make a trap for fools."

No man can expect to avoid being maligned by someone in the community and how much happier he will be if he never hears about it! In order to meet these situations we may need to develop a philosophy of life as expressed by a poet in these words:

"By thine own soul's law learn to live
And if men hate thee, have no care
And if men thwart thee, give no heed
Sing thou thy song, and do thy deed."

6. "Give every patient the best attention possible, then forget it until seen again."

This can hardly be done literally for we need to study our cases, but we sometimes needlessly worry about cases between times and in our hearts we know that we have not given them the best attention possible.

I think another thing which tends to make us unhappy as we grow older is the realization of the fact that we have not accomplished as much in our lives as we had hoped to do. Psychologists tell us that we are born with varying abilities to accomplish. Under our constitution we are said to be created "free and equal" but we

know that in any business or profession it is only given to a few to scale the heights of fame and fortune. Perhaps it is just as well that this is so for much of life's work must be done in the valleys and in the lowlands. I do not believe that many wars would ever be won by an army consisting entirely of generals. Not many people in any one community will suffer because of the doctor's inability to diagnose or to cure a brain tumor. A great many more will suffer if the doctors of that community cannot handle their confinement cases intelligently, or cannot diagnose and treat the seven-year itch when they see it. If we could retain something more of the idea of service with which we entered the study of medicine—the idea that we are trying to do the best we can for people in distress—and if we could induce people to believe that we are doing this, then I think we would come closer to occupying the enviable position in the esteem of the public which the older doctors held. I think that in our concern about the purely economic and scientific features of our profession we are likely to forget that if we are, in truth, members of the last existing guild we have an obligation to be noble over and above that of the men and women of almost any other calling. In dealing with people who cannot well afford to pay much for our services, if we could be willing more often and more graciously to count as part of our compensation the knowledge that we have the power and the privilege "to cure sometimes, to relieve often, and to comfort always" then we would be less inclined to apply the yard stick of monetary income as the main measure of success. If we are performing a useful work in our community, and doing it to the best of our natural born ability to accomplish, we are achieving success, and we should not be too unhappy about it because we are not also acquiring fame.

In conclusion, may I quote the words of a very good friend of mine, who has said:

"He is happiest, most useful, and hence most successful who earliest finds out what his community needs; and, finding out these current needs, applies the most direct, economical and human methods to supply them."

MANAGEMENT OF APPENDICITIS*

E. A. REGNIER, M.D.

Minneapolis

SINCE it has been estimated that over eight hundred articles on appendicitis have been written in the past five years, the question immediately suggests itself—why write another one? The reason for the voluminous literature on this one subject is obviously that there is a great deal of confusion in the minds of the profession as to what is the best method of managing a disease which causes over twenty thousand deaths in the United States each year. Paradoxical as it may seem, the incidence of the disease is greatest in the earlier years of life, the second and third decades showing the greatest incidence. The mortality of appendicitis should not exceed 1 per cent if all cases were seen early in the course of the disease and operated immediately. Likewise the morbidity would be minimal. Upon reviewing the literature one is impressed with the numerous attempts that have been made to arrive at a more rational treatment for the complications of appendicitis. A few teaching institutions and many individual surgeons are now teaching the so-called conservative treatment of appendicitis complicated by peritonitis. Statistical study of the reports on mortality and morbidity from various clinics means very little because of conflicting terminology and variations in the description of the pathological processes.

The reasons for this high mortality in appendicitis may be summed up as follows:

1. The first and foremost is procrastination on the part of the patient in seeking medical aid early in the course of the disease.
2. Failure of the medical consultant to recognize the disease or of attempts at medical management.
3. The promiscuous use of purgatives by the patient in the hope of avoiding medical attention.
4. Coincident constitutional diseases, such as severe diabetes, nephritis and cardiac diseases.
5. Mismanagement of the case after the diagnosis has been made.

Since the notable treatise on appendicitis by Fitz¹ in 1886, the plea for appendicitis has always been for early diagnosis and early treatment. Fitz was the first to call attention to the fact that a diagnosis must be made early in the course of the disease and that to attain the best results the treatment must be carried out before complications arise. Still today, we find many cases unrecognized before complications set in. The diagnosis of appendicitis, particularly in children, is oftentimes difficult because a small child is not able to give an accurate history and an accurate description of the symptoms. A careful and detailed history is the greatest single factor in arriving at a diagnosis. Pain is the one and only unailing symptom, being present in 100 per cent of the cases. Localized tenderness is almost as constantly present. Rigidity, vomiting, fever and leukocytosis vary with the progress and the intensity of the disease. Chills are not very common early in the disease and when they occur, usually signify gangrenous processes, usually accompanied by a fever of 101 or more and a relatively high leukocyte count.

There are times when tenderness and rigidity seem entirely too slight to be compatible with the patient's complaint. This situation often arises when the acutely inflamed appendix is retrocecal, retroperitoneal or over the pelvic brim and in the pelvis proper. A pelvic appendix can be diagnosed only by rectal examination. In other instances, rigidity and tenderness may seem all out of proportion to the duration of the complaint and usually signify a fulminating process in an obstructed appendix. One must be on guard in examining children lest some distant inflammatory process, such as pneumonia, simulate acute appendicitis. This is so common that we have a rule at the Minneapolis General Hospital that no child is operated unless an x-ray of his chest is first taken.

It has been our custom at the Minneapolis General Hospital to operate all cases of appendicitis as soon as the diagnosis is made unless the condition of the patient is such that a few hours of preoperative preparation are needed. This

*Read before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 4, 1936.

preparation means replenishing fluids by hypodermoclysis, intravenous glucose, blood transfusions and such measures as seem desirable to rehabilitate the patient sufficiently to warrant laparotomy. While there has been some variation in technic depending on the surgeon who is treating the case, the majority of patients are operated through a pararectus or right rectus incision. This type of incision is never chosen where an abscess only is to be drained. In cases where an abscess is to be drained, an incision is usually made directly over the abscess unless it be a cul-de-sac abscess, in which case, it is drained transrectally in the male or through the vagina in the female. It is our practice to always remove the appendix unless the patient's condition does not warrant more than drainage or unless the appendix is so inaccessible that attempts to remove it would add risk to the operation. The majority of the appendectomies have been done by the Senior Resident Surgeon, but the management of all cases is directed by the Staff. Acute and gangrenous appendicitis with local exudate over the surfaces of the appendix and surrounding structures have all had appendectomies without drainage. All cases with local abscesses or generalized peritonitis have had appendectomies, unless contraindicated as above mentioned, and have had drainage. Soft rubber drains are used, one drain being placed at the site of the appendix, one in the lateral gutter extending into the pelvis and the third placed lateral to the cecum extending toward the liver. The drains are shortened after the fifth day and usually removed by the eighth or ninth day. We feel that it is imperative that drains be lateral to the intestinal coils along the parietal peritoneum. Obviously, it is impossible to drain the peritoneal cavity in cases of generalized peritonitis, but by placing drains in the most dependent portions of the abdomen we have had very few secondary abscesses occur. The patient is then returned to bed and allowed to assume any position. We do not feel that the so-called Fowler position is an asset to drainage as this usually means placing the patient in a most uncomfortable position, whereby his vital capacity is greatly reduced because only the head and shoulders assume the Fowler position, the abdomen usually lying in a horizontal plane. All patients are given hypodermoclysis and intravenous glucose sufficient to give them an output of urine ap-

proximating a normal, which is between 800 and 1,200 c.c. per twenty-four hours. All patients are allowed fluids and food if they are not vomiting, including cases of peritonitis as well as clean cases. If a patient vomits unduly after the operation, the cause is usually due to ileus. Here one must make sure that there is no mechanical obstruction as this oversight usually means a fatality. Cases of ileus are treated by continuous siphonage of the stomach, sufficient morphine for comfort, and hot packs to the abdomen. Such patients are permitted to drink liquids by mouth if they so desire as this satisfies their thirst and tends to prevent parotitis and stomatitis often arising in very sick patients with limited oral hygiene.

In going over our records at the Minneapolis General Hospital we find that from 1926 to 1931 the mortality in 527 appendectomies was 7 per cent. In this group 226 were suppurative cases and in this group the mortality was 11.6 per cent. In 171 acute and gangrenous cases the mortality was 6.4 per cent. Of the seventy-six cases occurring in children, twenty-four were acute with a mortality of 12.5 per cent; forty-seven suppurative cases with a mortality of 12.7 per cent. This makes a total mortality of appendicitis in children of 11.7 per cent for that five year period. In the years 1932 to 1935 inclusive, there were 749 cases of appendicitis treated at the Minneapolis General Hospital with a mortality of 6.3 per cent. These figures are slightly higher than many reported in the literature, but they compare very favorably with the average throughout the country. It is noted that in the five years previous to 1931 there was a total of 527 cases as compared to 749 cases in the four year period. This is an average increase of ninety cases per year in the last four years.

In order to get a further insight into the morbidity and mortality of these cases, a statistical study of 306 cases treated in the years 1934 and 1935 was made. Two hundred and fifty-eight cases were classified as acute, gangrenous and suppurative with a mortality of 6.5 per cent. There were twelve abscesses with a mortality of 8.5 per cent. There were forty-nine cases of spreading peritonitis with a mortality of 20 per cent. The total mortality of the entire group was 6 per cent. The incidence of the disease was approximately the same in males as in females. In the suppurative groups, the ratio

of males to females was 3 to 1. Seventy per cent of the cases were under thirty years of age.

In order to further study the percentage of morbidity and mortality in patients with diffuse spreading peritonitis, 106 consecutive cases of this type were studied. These cases were treated in 1932, 1933 and 1934. The average age of these 106 patients was 25.2 years. Forty-eight of these had had cathartics. The average number of days of illness before coming to the hospital was 3.8 days. The average stay in the hospital was 21.6 days. There were twenty-two deaths among the 106 patients, or a mortality of 21 per cent. This is practically the same mortality as the series for the years 1934 and 1935.

I chose only the cases of generalized peritonitis because it was impossible to segregate cases of local peritonitis and cases of abscess. These two types of cases had been indexed interchangeably; hence, it would simply be confusing to try to segregate the two groups. It is significant that the mortality of appendicitis at the Minneapolis General Hospital over a ten year period has averaged between 6 and 7 per cent. In the five years previous to 1931 the mortality for the acute, gangrenous and peritonitis cases combined was 11.6 per cent. This figure has likewise remained practically the same during the last five years. In spite of the fact that the number of cases have practically doubled in the last five years and that there have been 25 per cent more cases of generalized peritonitis, the mortality shows a slight decrease during the last five year period.

In reviewing the history of the treatment of appendicitis, we find cycles of change in therapy. Beginning with the epoch-making paper by Reginald Fitz in 1886 in which he recommended the early operation of appendicitis; continuing on through writings of such men as Fenger,³ Senn,¹⁴ John B. Murphy⁹ and many others, the plea has always been for early operation. However, as early as 1902 Ochsner¹¹ published his first paper advocating deferred treatment in appendicitis complicated by peritonitis. The next great exponent of this form of treatment was Sherren¹⁵ in 1925. In the last five years we find many clinicians advocating this form of therapy, particularly Alton Ochsner,¹⁰ Collier and Potter² of Michigan, Taylor and Schmidt¹⁶ of Wisconsin, Reid¹³ of Cincinnati, Wangenstein and Sperling¹⁷ of Minnesota. It will obviously

take several years before the relative merits of either form of treatment will be ascertained. From a review of the literature it is evident that practically all clinicians have been desirous of improving their morbidity and mortality in the complications arising from appendicitis.

We have followed the teaching of operating all cases immediately after making a diagnosis of appendicitis. The nature of our material is somewhat different than that of other institutions in that our patients are all indigent people residing in Minneapolis. While many of our patients are seen late in the course of the disease, they are never subject to distant transportation after a diagnosis is made. We, therefore, see relatively few walled off abscesses and not many of our patients with generalized peritonitis come in a moribund state, with the pulse weak and thready, the abdomen severely distended and the patient extremely dehydrated. In patients admitted with advanced peritonitis, operation is delayed long enough to replenish fluids, to give transfusions or any other procedure which might safeguard the patient through an operation. The term, generalized peritonitis, while used very commonly, should be restricted to those cases wherein all parts of the peritoneal cavity are involved and, as previously stated, these cases usually come into the hospital in a moribund state. The term, diffuse or spreading peritonitis, meaning that the process is no longer limited to the right lower quadrant, is really a better term to describe most of our cases. After all, the pathologist is the only one who can tell the extent of the involvement of the peritoneal cavity in a generalized infection. The surgeon at operation has opportunity to determine that the process is no longer limited to the right lower quadrant, but this does not mean that the entire peritoneal cavity is involved and in most instances only the lower half of the abdomen is contaminated.

John B. Murphy in a clinic on appendicitis made the following statement: "By operation we take the course of the disease in our own hands—by not operating we leave the case in the hands of a blind and often terribly cruel fate." Christian Fenger, a few years earlier, made the following statement: "Appendicitis is so atypical in its course and presents such an infinite variety of clinical features that a certain time in hours or days cannot be a guide to determine opera-

tion." Certainly the progress of the disease in any one case does not follow any set rule as to days or hours. The pathological processes may have progressed further eight hours after the onset of symptoms in one instance than in a similar case forty-eight or seventy-two hours after the onset. In most instances of spreading peritonitis the area of tenderness and rigidity of the abdomen greatly magnifies the extent of the pathological process within. We have always felt that a case of spreading peritonitis would do better if the cause were removed. It takes a great deal of fortitude to open an abdomen in the face of a diffuse, generalized peritonitis when operation has a very limited amount of relief to offer. Buchbinder¹² in a very splendid article on the treatment of peritonitis made the following statement: "We believe that operative therapy in spreading or diffuse lesions is limited to the source of infection, be it a suppurative appendix or leaking suture line in the bowel. We also believe that early operative attack during the stage of attack is better than the so-called conservative management." He has shown, both experimentally and clinically, that during the spreading stage of peritonitis the mortality is reduced by removing the focus of infection. McGrath and Eiss⁸ have shown that postoperative complications are more frequent and severe where the appendix was not removed.

Anyone will agree that a leaking suture line following the resection of a colon is indication for reopening the abdomen. Likewise, a perforated peptic ulcer is best treated by closure of the perforation. Peritonitis due to leakage from a ruptured diverticulum of the colon, perforation by a foreign body or a gunshot wound of the colon, is no different than that caused by an appendix which has sloughed at its base, liberating a large fecalith and leaving the cecum wide open. What hope is there for localization when the peritoneal cavity is being flooded by the liquid contents of the cecum? These are questions which present themselves in abdominal diagnosis when a patient is brought in with a generalized peritonitis. An appendiceal abscess, in the majority of instances, is probably begun as a local process and terminated as such. General peritonitis does not usually localize in the region of the appendix, but more probably in the

pelvis or in multiple areas in the dependent portions of the peritoneal cavity.

Irrespective of the method of treatment of peritonitis, it is obvious that until we have better methods of treating this condition, it will always carry a very definite and high mortality. It is primarily a struggle between virulence of the invading organism and the resistance of the patient and the profession must be open minded to better methods of therapy.

In our own hospital 229 cases were treated in 1932 with a mortality of 10.9 per cent. In 1933, 214 cases were treated with a mortality of 3.7 per cent. In 1934, 182 cases were treated with a mortality of 6 per cent. In 1935, 124 cases were treated with a mortality of 4.8 per cent. Surely these marked variations in mortality cannot be accounted for by variations in technic or errors in treatment. Virulence of the organisms or the virulence of intercurrent infections, such as pneumonia, must be the answer. We had a severe epidemic of postoperative pneumonia in 1932 which made operations almost prohibitive during the fall of that year.

In summary, we have reviewed the mortality statistics for the past ten years at the Minneapolis General Hospital. The mortality rate over the ten year period for all cases treated has decreased 1 per cent. The mortality rate for all suppurative cases, which includes gangrenous appendicitis with local peritonitis, abscess formation and general peritonitis, is approximately 12 per cent. The mortality in cases with localized abscess is approximately 8 per cent. For all cases of spreading peritonitis, the mortality is approximately 21 per cent. The total number of cases studied was 1,276. Appendicitis complicated by abscess formation or spreading peritonitis is three times as common in males as in females. The incidence of appendicitis is approximately the same in both sexes. Appendicitis is essentially a disease of the earlier years of life, 70 per cent of our cases occurring in the first three decades. The mortality in appendicitis complicated by peritonitis is very high. This is in a large part influenced by self medication on the part of the patient, use of cathartics in 50 per cent of the cases, procrastination in seeking medical advice and to a slight extent is due to errors in diagnosis. We feel that until the deferred method of treatment or the so-called conservative method of treat-

ment of appendicitis complicated by peritonitis, is placed on a more rational basis, this method should not be taught for universal use. We feel that in the hands of an individual surgeon this method of therapy may often turn the tide of peritonitis into a more favorable course, but the misapplication of this method would lead to greater disaster than confronts us at present. We feel that there can be no rule as to the number of hours or days after the onset of the disease when one can say that this case should be operated and this one should not. Often-times what appears to be a picture of generalized peritonitis from the clinical findings proves to be a local process at operation. Every case of appendicitis with peritonitis must be treated individually. Patients with walled off abscesses or those who have passed the climax of their illness may safely be treated by conservative methods. There is no medical treatment for appendicitis. Mortality in uncomplicated appendicitis is negligible. The problem first to solve is that of prevention of complications and, secondly, that of better treatment of peritonitis.

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REGIONAL (TERMINAL) ILEITIS*

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I AM presenting this paper not primarily to add anything to knowledge of terminal ileitis, but rather to call to attention its existence and to publish again the criteria by which the disease can be recognized and the methods by which it can be properly treated.

Terminal or regional ileitis obviously always has existed but it was not identified as an entity until Crohn, Ginzburg, and Oppenheimer designated and described it in 1932. Very likely it is not particularly rare, for individual surgeons have recorded a dozen cases occurring in their practices in the last few years. Crohn now has had twenty-eight cases; that is, fourteen more than were reported in his 1932 series.

Pathology

In 1932, Klemperer, of Mt. Sinai Hospital, New York, made a searching study of the speci-

mens resected by Berg; I am not aware of anything having been added to knowledge of the pathology since.

Grossly, there is always a tumorous, benign, granulomatous mass and all of the specimens in Crohn's series were from the ileocecal region. It is reasonable to assume, however, that the condition also can exist elsewhere in the small bowel. The tumors naturally will differ in type and vary in size according to the stage at which the disease is recognized. There is extant no description of the microscopic appearance of the tissue in the early stage, since in all the cases in the series the process had reached advanced stages and had given symptoms for more than a year. As has been stated, all the specimens were removed from near the terminal portion of the ileum.

The number of specimens Crohn, Ginzburg and Oppenheimer had for study was thirteen.

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"Microscopically" they wrote, "no specific features or germs can be demonstrated. The stained histologic sections showed various degrees of acute, subacute and chronic inflammation, with variations in the predominance in polymorphonuclear, round cell, plasma cell and fibroblastic elements. In the early stages the lesion is a diffuse one, involving mainly the mucosa and submucosa with the presence of some inflammatory serosal reaction. The mucous membrane shows areas of marked destruction, and at times the glandular structure is almost completely gone, leaving an atrophic layer of epithelium, the result of a regenerative process." Also the authors wrote that some giant cells are found.

The picture, then, is not unlike that of a tuberculous process; nevertheless all methods of investigation used failed to disclose evidence of tuberculosis in any of the thirteen specimens. Inoculations of guinea-pigs, rabbits and chickens with triturated material from lymph nodes adjacent to the lesions and from the intestinal wall all gave results that were negative for tuberculosis; moreover, evidence of pulmonary foci were not found in examination of any of the fourteen patients.

Symptoms and Signs

The condition is mostly confined to patients who are less than forty years of age and more males than females are affected. The main complaints are of fever, although fever can be absent; diarrhea, but without tenesmus; loss of weight and progressive anemia. The stools sometimes are mushy or liquid, and contain free pus, coagulated lumps of mucus and streaks of blood. Naturally, when the lumen becomes unduly contracted, constipation and symptoms of obstruction appear. Vomiting may occur at times and will occur when obstruction becomes marked. Pain is a prominent symptom, and, since the lesion is usually near the ileocecal region, the pain will occur in the region of McBurney's point or between that point and the umbilicus. It is described as dull and cramp-like and is often relieved to some extent by defecation. Obviously, the symptoms will vary according to the extent of the pathologic process that is present.

The general symptoms are weakness, loss of weight and anemia; the degrees of the anemia will

depend on the profuseness of the diarrhea and on the amount of blood lost. There is only moderate leukocytosis and the temperature varies from normal to 103° F., depending mostly on

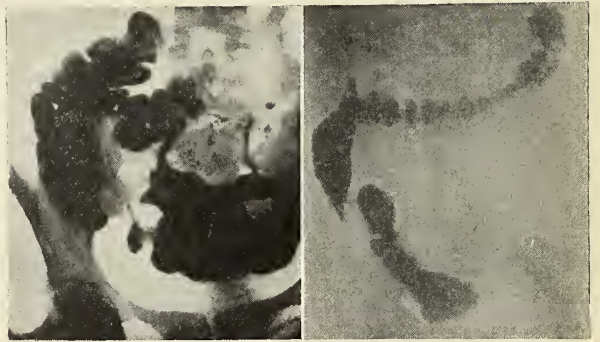


Illustration showing "string signs" taken from article by J. L. Kantor on "Regional Ileitis: Its Roentgen Diagnosis," *Jour. Am. Med. Assn.*, 103:2016-2021, 1934.

whether or not fistulous tracts are forming. These tracts may extend at times through the abdominal wall, into operative appendiceal scars, into the cecum and even to the sigmoid.

Physical Examination

A mass is palpable in the ileocecal region. Fistulas may be present; there are always some emaciation and anemia; symptoms of intestinal obstruction may be present. The mass is usually somewhat movable and sometimes fills the lower right quadrant; it is firm, irregular and gives rise to tenderness. If fistulas have formed, the position, contour and size of the mass will vary.

On account of the situation of the pain and of the tumor, the patient's abdomen often bears the scar of a recent appendicectomy, mute but eloquent evidence of hurried diagnosis. The physician is not always to be blamed, however, for it is not easy at times to make the differential diagnosis. At least half of Crohn, Ginzburg and Oppenheimer's patients presented scars of operation but the symptoms had persisted and the condition of the patients had grown progressively worse; therefore all of the fourteen were submitted to exploratory operations and the tumors were resected.

When the ileum becomes stenotic the patient presents the grave condition of intestinal obstruction with evidence of visible peristalsis and distention.

Roentgenographic Findings

The "scout film" localizes the obstruction in the lower middle portion of the abdomen, toward the terminal part of the ileum. The constant finding, after a barium meal, is that of delayed motility in the terminal part of the ileum. Of course, when the condition has progressed towards stenosis, what Kantor has designated as the "string sign" is present, and the localization becomes more definite. A barium enema will exclude involvement of the colon, for in terminal ileitis the colon is not involved unless there are fistulas that open into the sigmoid or the cecum.

Differential Diagnosis

The condition must be distinguished from other diseases, some of which produce a mass in the ileocecal region associated with pain, diarrhea and fever.

The first of these to be considered is non-specific ulcerative colitis. Roentgenograms made after a barium enema, rightly interpreted, and demonstration of the lesion in the lower part of the colon, will identify this condition in the great majority of cases; it will fail only in that small percentage of cases in which the ulcerative lesions are in the upper reaches of the colon and in the terminal part of the ileum. Nonspecific ulcerative colitis does not cause fistulas, except near the rectum and anus, and a palpable mass is a rarity.

Ileocecal tuberculosis, with all its evidences, is rather easily diagnosed clinically and by laboratory methods and should not lead astray a reasonably careful clinician.

As was stated, Crohn, Ginzburg and Oppenheimer commented that in at least half of their original cases of regional ileitis, operation for appendicitis had been performed. In The Mayo Clinic series were eighteen patients, ten of whom had undergone appendectomy. Semansky, of the Minnesota University Hospitals, in a careful, recent review of the subject, is authority for the statement that in half of the cases abnormalities of the terminal portion of the ileum were noted at the time of the operation and that in cases in which appendectomy had not been done previously, the mucosa of the appendix was normal. There was a change only in the outer coats, attributable to the presence of adjacent inflammatory disease.

There remains then only lymphosarcoma, intestinal or mesenteric tuberculosis and Hodgkin's disease, all of which, in many features, simulate regional ileitis. Obviously only at the operating table, at postmortem examination, and by examination of tissue can these conditions be distinguished from one another. Crohn, Ginzburg and Oppenheimer have stated, "Sarcoma of the intestine is usually multiple, causing dilatations at various levels, and involves the jejunum as well as the ileum and not particularly just 8 to 12 inches of the small intestine." In Hodgkin's disease there may be a palpable mass but the characteristic monocytic blood picture or examination of a regional lymph node will reveal the true nature of the process. Actinomycosis of the ileocecal region may result in fistulas, but the yellow granules often can be demonstrated. Carcinoma may be present, but both conditions call for the same treatment, surgery, and biopsy of the removed segment will allow the diagnosis to be made.

The Clinical Course

The early stage naturally will be characterized by vague intestinal distress and pains in the ileocecal region. It is not inconsistent to believe that some cases are abortive and terminate in spontaneous recovery. But in cases in which the condition becomes progressively worse, the course may include: (1) acute intra-abdominal disease with peritoneal irritation; (2) symptoms of ulcerative enteritis; (3) symptoms of intestinal obstruction; (4) persistent and intractable fistulas in the right lower abdominal quadrant.

Treatment

As has been said it is possible that in some of the milder cases the patients eventually recover without operation, but if they do so recover it is not likely that medical treatment has anything to do with the result. The treatment is surgical and the ideal procedure consists of dividing the ileum well above the lesion, removing the affected portion and the ascending colon, and making side-to-side anastomosis of the proximal end of the ileum and the transverse colon. The surgeon should not forget to perform ileostomy about four inches proximal to the site of the ileocolostomy, using a mushroom catheter, with its exit through a stab wound near the center of the abdomen. A short circuiting oper-

ation is permissible only when the condition of the patient is so perilous, or when the tumor is so involved with other structures, as not to justify the major procedure at the time. One always can reoperate later, when the patient's condition

has improved sufficiently to warrant the more formidable attack. Restitution of the patient to perfect health is the rule and is the primal justification for the surgical procedure as here outlined.

ACTIVE PULMONARY TUBERCULOSIS WITHOUT SYMPTOMS*

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THE purpose of these remarks is to present a phase of pulmonary tuberculosis which has been recognized and discussed for several years and which needs wider and fuller appreciation. Emphasis for this particular problem is desirable because of its importance to the patient and to his community. The thought in mind is the silent lung parenchymal lesion found particularly in the teens and twenties which in many instances progresses without symptoms for months, or even years.

It is discouraging but still true that the majority of persons when first found with active tuberculosis of the lungs have advanced lesions. This situation obtains in spite of the active campaign against tuberculosis waged in the past thirty years comprising intensive education of the public, a marked increase in sanatorium beds, a substantial improvement in undergraduate medical training as well as postgraduate instruction.

An encouraging break in this persistent cloud is the increasing number of people asking for advice who have definite lesions in their lung parenchyma which have not reached the symptom-producing stage. This group is becoming larger for three reasons. First, families and groups in which individuals with positive sputum have been found are being intensively investigated.

Secondly, there is a more common use of the Mantoux surveys whereby large numbers of apparently healthy individuals such as high school and college students, employees of large industrial concerns and hospitals, are tested with tuberculin, the positive reactors submitting to roentgenograms of the chest and physical examination. Thirdly, more physicians are using the Mantoux

test routinely in their practice and following the positive reactors as just described. As these three methods of tuberculosis control develop and are extended in any community there accrues to the physician in that community not only an increase in his practice but an augmented obligation to give sound counsel.

It is not easy to get away from the beaten path of undergraduate instruction and textbook pictures. That particular concept as it relates to lung tuberculosis reveals a person who is coughing, expectorating sputum with demonstrable tubercle bacilli, having afternoon or evening fever, losing weight, experiencing vague digestive symptoms, chest pains, hemoptysis and so forth, and exhibiting definite abnormal physical signs in the chest as well as gross roentgenographic lesions. This type of tuberculosis from a diagnostic standpoint requires no unusual acumen. It does require a long period of treatment usually in an institution to control the disease.

The type of pulmonary tuberculosis, however, which has provoked this discussion is not the textbook picture. On the contrary, it is that illustrated by the person who feels perfectly well, presents no symptoms whatsoever, may give a history of exposure to an individual known to have positive sputum, or who has been sifted out in a Mantoux survey or has been tested by his physician in the course of a routine examination. He does exhibit a positive reaction to a skin tuberculin test and is found to have an infiltration in the chest roentgenogram usually in the first or second interspace. Rarely will these people have any abnormal physical signs in the chest.

This type of lung disease can easily lead one to regrettable conclusions. Because symptoms

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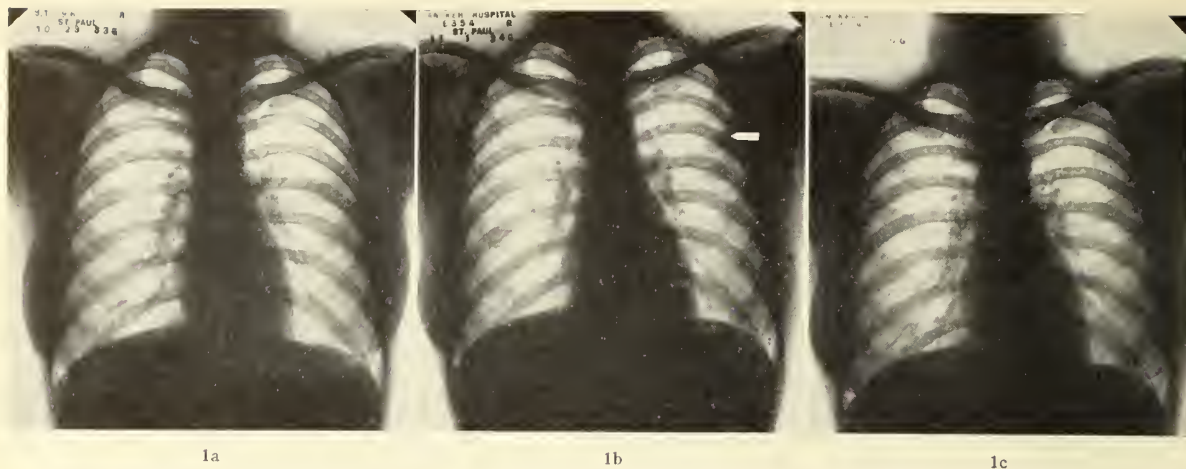


Fig. 1. Case 1. *a*, October, 1933—Chest radiograph shows no abnormalities. *b*, November, 1934—Parenchymal lesion in left second interspace. *c*, January, 1936—Complete resolution of left upper lesion without treatment.

are absent there is a strong temptation to assure the patient that he has "only a small spot on the lung," that x-ray shadows by themselves do not produce illness, that he has no fever, has lost no weight, has no cough, and therefore cannot have active tuberculosis requiring treatment or even observation. Stories such as these are not unusual. The picture which presents itself months later is one which requires prolonged treatment with an uncertain result.

The behavior of these early symptomless lesions is unpredictable. Some will retrogress without treatment. This type is well illustrated in Case 1.

Case 1.—Miss I. H. entered training at Ancker Hospital in 1927, at the age of nineteen. In 1929, she had a positive Mantoux test and on finishing training, in 1930, a chest film was clear. In October, 1933, she returned to the hospital for general duty at which time chest films (Fig. 1a) were again normal. In November, 1934, a routine chest film (Fig. 1b) showed a definite parenchymal infiltration in the left second interspace. She continued on duty and periodic roentgenograms have shown a consistent decrease in the lesion to the point where it is now scarcely perceptible (Fig. 1c). At no time during this period has she been ill.

Others will be discovered and with observation will be found progressive and with bed rest will clear in a satisfactory manner as is shown in Case 2.

Case 2.—Dr. M. D., aged thirty-two, who came to Ancker Hospital as an interne in July, 1934. His Mantoux test was positive at the time but films of his chest (Fig. 2a) were clear. On completing his in-

ternship in June, 1935, a routine chest film (Fig. 2b) disclosed a lesion in the left first interspace about the size of a small pea. He presented no symptoms but was advised to have frequent follow-up examinations. After a three weeks' vacation in northern Minnesota, he returned for reexamination and his chest film, on July 8, 1935, disclosed an increase in the lesion (Fig. 2c). He was put to bed and periodic roentgenograms showed a decreasing lesion which, after a few months (Fig. 2d), became stationary and remained so.

This type of disease is also shown in Case 3.

Case 3.—Miss M. M., who entered training at Ancker Hospital, in February, 1933, at the age of nineteen. She had a positive Mantoux test and her chest roentgenogram was negative. She remained well. A routine chest film in January, 1936, revealed an infiltration in the right lung at the level of the third rib. She was permitted to continue on duty as she felt perfectly well. A month later a chest film disclosed an extending lesion and, although she had no symptoms, she was put to bed and the lesion is decreasing.

Still others will pursue an indolent course for months or years and then within a comparatively short time will develop fulminating disease. Cases 3 and 4 typify this group.

Case 3.—In September, 1931, Mrs. La P., at the age of eighteen, entered training at Ancker Hospital. Her Mantoux test was negative and her chest film clear. In March, 1932, another Mantoux test was negative but in September, 1932, it was positive and a chest film at the time was still clear. In May, 1934, a lesion in the right first interspace with apparent paratracheal glandular involvement was noted. She felt quite well and was followed by periodic roentgenograms which showed little change. She completed training in the fall of 1934 and was advised to return for continued observation. In November, 1934,

a definite decrease in the lesion was observed and in December there was no change. She failed to report again until April, 1935, when an increase in the parenchymal infiltration was noted in the right upper lobe. She was advised to enter the hospital but re-

in the left first interspace (Fig. 3b). She felt perfectly well. In April, a decrease was apparent in this lesion (Fig. 3c). In May, a follow-up x-ray was ordered but not taken. On June 18, she had a frank hemoptysis and a chest film (Fig. 3d) showed an in-

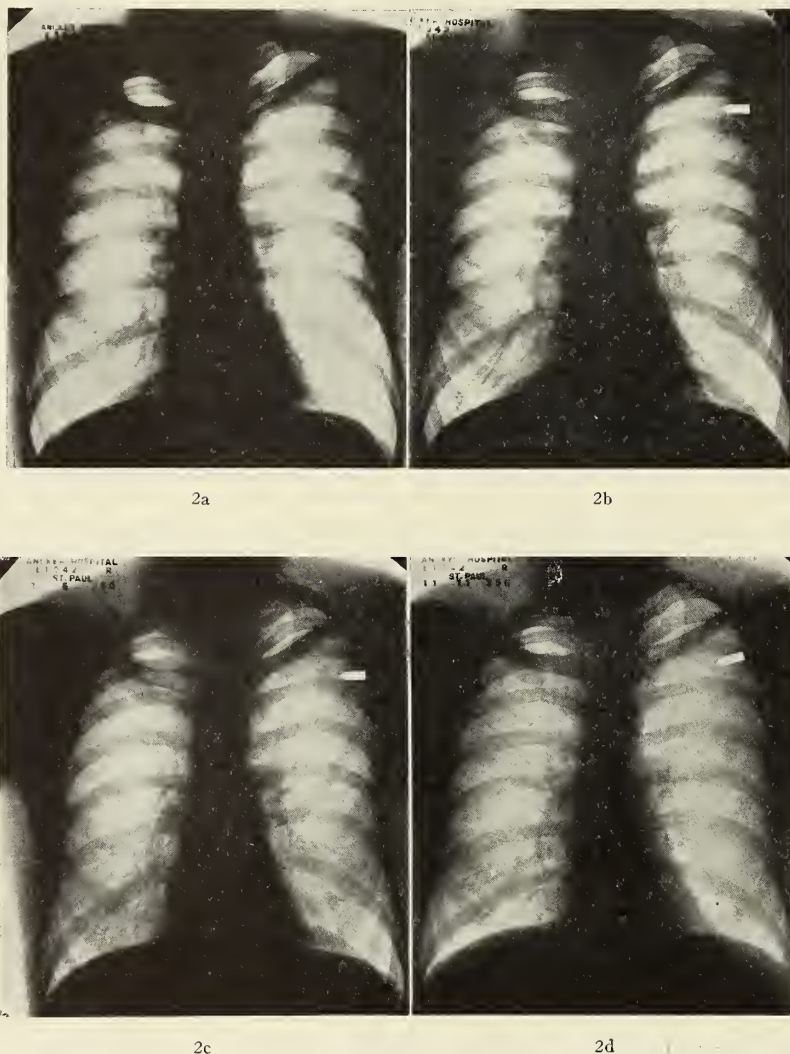


Fig. 2. Dr. M. D. *a*, August, 1934—Chest radiograph shows no abnormalities. *b*, June, 1935—Small lesion in the left first interspace. *c*, July, 1935—Increase in the left upper lesion three weeks later. *d*, November, 1935—After four months' rest. Resolution of lesion in the left upper lobe.

jected this counsel and married. In September, 1935, she returned for examination, four and a half months pregnant and with an extensive excavating lesion in the right upper lobe. Pneumothorax was begun at once and in February, 1936, she delivered a healthy daughter and had no subsequent trouble.

Case 4.—Miss C. H. entered training at Ancker Hospital, in September, 1933, at the age of nineteen. Her Mantoux test was negative, but her chest film showed a calcified area in the right lower lobe (Fig. 3a). In February, 1935, her Mantoux test became positive and a small parenchymal infiltration was noted

crease in the left upper lobe lesion with cavitation. Pneumothorax was instituted at once which had to be supplemented with a phrenicectomy to control the disease.

The discouraging type which refuses treatment early because she is lulled into a sense of false security by the absence of symptoms is portrayed clearly in Case 5.

Case 5.—Miss H. H., aged twenty, as a high school senior was found to have a minimal lesion in her right

upper lobe in a Mantoux survey. This disease was identified in May, 1932, and because she felt well she thought the doctors were "crazy" to suggest hospital observation. In September, 1933, sixteen months later, she came of her own accord and asked for treatment.

their school work or vocational pursuits?

To lay down a single rule for all such cases would be arbitrary, in many instances unwarranted and in some disastrous. As has been

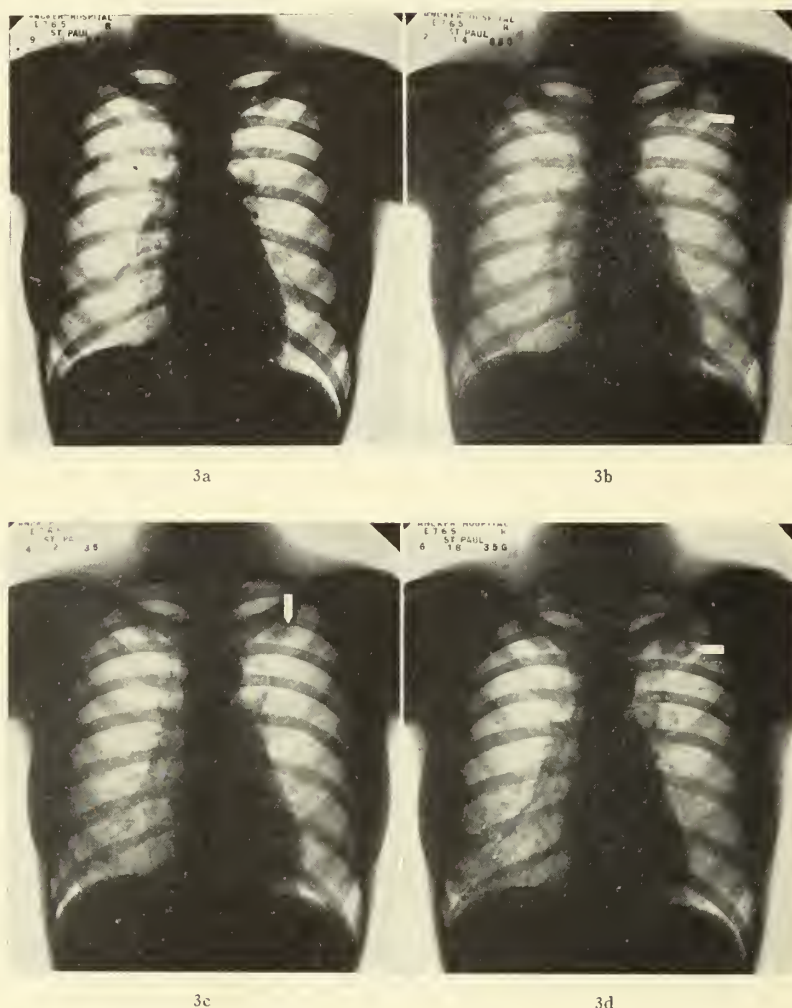


Fig. 3. Miss C. H. *a*, September, 1933—Chest clear except for calcification of the right lower lobe. *b*, February, 1935—Parenchymal lesion in the left first interspace. *c*, April, 1935—Decrease in the left upper lesion. *d*, June, 1936—After hemoptysis. Increase in the left upper lesion with cavitation.

Then she had a cough, positive sputum and an excavating right upper lobe tuberculosis. Pneumothorax and a ten months' stay in Ancker Hospital controlled her disease.

These illustrative cases raise the pertinent question as to how one should manage persons with symptomless tuberculous lesions in their lung parenchyma. Shall we permit them to continue in school or at work under close observation? Should we advise a period of observation in a hospital or sanatorium? Or should we use ambulatory pneumothorax and not interrupt

shown in the instances cited above, the course is variable and impossible to forecast.

If we are dealing with people such as hospital employees, students in schools with adequate health service facilities, or individuals who will intelligently cooperate by reporting for necessary reexaminations, in many instances it will be safe to permit continuance of usual activities if frequent chest roentgenograms are taken. These may be desirable once a month and occasionally at shorter intervals.

If the person with the silent parenchymal lesion is not in a position to be watched closely, or if he is the type of person who is prone to hide his head in the sand and disregard sane advice, a period of sanatorium observation should be urged and in no uncertain terms. This, beyond doubt, is the ideal method of handling such individuals so that nothing is left to chance. And here, again, serial roentgenograms are essential to know accurately which way the wind is blowing.

If the infiltration decreases, a watchful-waiting policy should be pursued. If with bed rest an increase in the lesion is noted, collapse therapy should be considered and for those whose lesions progress, as in some of the recited cases, artificial pneumothorax without delay is imperative. But for the symptom-free non-progressive case, pneumothorax is clearly not indicated without a period of observation.

When collapse treatment is advisable, artificial pneumothorax should be tried first and should be induced in a hospital or sanatorium and not in one's office. Because of the apparent simplicity of induced pneumothorax, its smooth course in most cases, and the satisfactory results obtained where a good collapse is effected as reported by careful workers from reputable institutions, an unbridled enthusiasm for the use of this procedure has appeared in certain places for ambulatory patients. And here, to avoid misunderstanding, let it be clearly understood that backed by an extensive experience I have a clear picture in mind of the usefulness of artificial pneumothorax for lung tuberculosis. Full well do I know that the person with progressive or advanced tuberculosis in his lungs who obtains an effective collapse with air is fortunate beyond words. But it also must be recognized that its use has dangers and complications. Recently two patients in Ancker Hospital developed spontaneous pneumothorax within six hours after a primary injection of air. In both instances the respiratory distress developed so rapidly and became so severe that had they not been in an institution where prompt service was available, death would have ensued in a short time. Pleural shock and air embolism are uncommon but do occur and pleural effusions may appear and produce acute illness. However deserving of consideration these factors may be, they do not markedly condition my reactions regarding am-

bulatory pneumothorax. What does influence my thinking is the undeniable fact that tuberculosis in the lung parenchyma even in the minimal stage is still a serious and potentially fatal disease. To disregard the constitutional nature of the malady is a mistake committed each time ambulatory pneumothorax is used without due consideration of the possibilities and facts to which allusion has just been made. If pulmonary tuberculosis is inherently the destructive killing thing we know it to be, sound thinking cannot accept as adequate therapy the periodic injections of air into the pleural cavity of a person who continues to pursue his usual daily activities.

In communities such as Philadelphia and Chicago, where the demand for tuberculosis greatly exceeds the supply, ambulatory pneumothorax for suitable cases is justifiable and is being used for frankly active cases. It is, however, a distinctly "second best" measure and should be condoned only in those parts of the country where the "first best" measures are not available. Modern sanatorium care is unquestionably the "first best" measure.

It is quite obvious from this short discussion that the problem of the silent parenchymal lesion is important but not simple nor one with only one solution. There are good reasons for advocating that this particular phase of pulmonary tuberculosis be made a major objective in the anti-tuberculosis campaign. In the first place is the strong appeal to the individual. It has become almost axiomatic that, granting good treatment, the person found with minimal tuberculosis will achieve a lasting satisfactory result. The slogan, "Early discovery, early recovery," has a factual basis. The majority of these silent lesions are found in the minimal stage. In the second place, these people have tuberculosis which has not progressed to the infectious stage and with proper care will not. One cannot conceive of a better type of tuberculosis control in the absence of a specific preventive than a systematic, persistent search for persons with these silent, non-infectious tuberculous lesions of the lung. The identification and adequate treatment of such people will forestall an incalculable dissemination of tubercle bacilli. One major obstacle to be overcome is the task of convincing persons who do not feel sick that they have something which in time may produce illness and therefore demands observation or treatment. Here enters into the

picture the art of medicine, wherein that attribute of many physicians which induces confidence and promotes coöperation in their patients is clearly shown.

Conclusions

1. Active pulmonary tuberculosis without symptoms occurs frequently as the silent progressive parenchymal lesion found not uncommonly in young adults.

2. It can be detected in most instances only by a chest roentgenogram.

3. Its course is unpredictable and therefore

requires close observation by serial roentgenograms of the chest.

4. Aside from those persons employed in institutions, students, or employees of concerns who can be followed closely, the safest and best course to follow is a period of sanatorium study.

5. Ambulatory pneumothorax for persons with these silent lesions is justifiable only in communities where adequate sanatorium beds are unavailable and when the lesion is progressive.

6. Pulmonary tuberculosis has been, is and will be a serious disease requiring careful study and intelligent, meticulous treatment.

A PROLONGED TEST OF MILK AND HONEY DIET

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IN the course of studies on nutritional anemia of rats, carried out during the past two years at the University of Minnesota, the writer obtained clear evidence of the value of adding honey to the whole milk diet of these animals. The beneficial effects were particularly marked when honey of the darker type was used. In view of these results he decided to play the rôle of an experimental animal and to test personally the effect on man of a diet restricted to milk and honey. The experiment was continued for a period of twelve weeks.

Diet and method.—The unit of the diet consisted of a mixture of one quart of milk with 100 gms. of honey. The latter was dissolved in a small amount of milk. This solution was then thoroughly mixed with the rest of the milk. The composition of this unit is given in the following table.

COMPOSITION OF THE UNIT OF THE DIET

Constituents	C.C.	Cal	Fe mgms.	Cu mgms.	Mn mgms.	Solids gms.
1 quart of milk...	950	684	2.28	0.14	0.03	114
100 gms. of honey...	70	335	1.00	0.10	0.22	80
	1020	1019	3.28	0.24	0.25	194

As a matter of fact, 1 c.c. of the mixture is equal to one calorie. This makes calculation of the diet very simple. Obviously the mineral con-

tent of honey varies and the numbers given in the table represent an approximate average taken from determinations by various authors, namely, 10 mgms. of iron, 1 mgm. of copper and 2.2 mgms. of manganese per kg. of honey. Darker honeys will tend to increase the mineral intake and light honeys will tend to diminish the mineral intake per unit.

As a rule, 500 c.c. of this mixture were ingested every two hours from 8 A. M. to 8 P. M. Buckwheat honey (dark) was used as a supplement to milk during the first four weeks of the diet. Sweet-clover-basswood honey (light) was used for the next four weeks. Then, the intake of dark and white honeys was alternated daily. There was a transition period before the beginning of the diet, consisting in a gradual abolition of breakfasts, lunches and dinners and a substitution for them of the milk-honey diet (November 19 to 27). A similar transitional period was maintained after the expiration of the diet. During this period (February 20 to March 2) skim milk powder, dried yeast, and crackers were added to the diet in increasing quantity; farina and chicken soup were used the latter part of the period. Starting March 3 normal breakfasts, lunch and dinners were gradually resumed.

Pasteurized milk from the University Dairy was used throughout the experiment. Weekly

changes in weight and in the hemoglobin reading (Haden apparatus) were recorded. Weekly urine analyses for sugar and proteins were performed. Daily bowel movement was noted, general subjective feeling and other symptoms, if any, were observed. Iodine (1 drop of 10 per cent K I solution) was occasionally added to the diet and a little NaCl dissolved in water was ingested almost daily. Weekly consultations were held with Dr. Irvine McQuarrie of the Pediatrics Department of the University.

Results.—The diet lasted from November 28, 1934, to February 19, 1935. The initial weight (November 20) was 137 pounds without shoes. During the experiment the weight oscillated between 134.5 and 135.5 pounds. Initial hemoglobin reading was 12 gms. per 100 c.c. of blood, which changed to 13 gms. per 100 c.c. of blood by the beginning of the seventh week. The latter figure remained to the end of the experiment. There was no sugar or protein in the urine. As a rule the bowels moved daily. Occasionally there was no daily bowel movement. However, it was resumed the next day without the use of any laxative. Feces were peanut-like in consistency, yellowish-gray in color, comparatively soft, and were almost odorless. The average frequency of bowel movement for the first four weeks of the diet was 1.4 times daily and for the remaining period of the diet, 1.2 times daily. A general feeling of well-being was experienced. The ability to work was not impaired by any means and was rather better than the average. There was no feeling of sluggishness or tiredness noticed throughout the duration of the experiment.

The fact that pasteurized milk is low in vitamin C was fully appreciated. However, since the period of the development of scurvy has been said to be from four to eight months (Med. Res. Council, 1932), the addition of orange juice was postponed to the latter part of the period of observation. Apparently this addition was delayed too long because certain symptoms somewhat suggestive of vitamin C deficiency were noticed. Confirmation of the clinical impression that they were symptoms of a dietary deficiency was indicated by their disappearance after orange juice was added to the diet. The phenomena observed will be dealt with in chronological sequence.

On December 8 a small amount of fresh blood was noted on the feces. There was no obvious

explanation for this. The stool passed was not considered to be sufficiently hard to cause mechanical injury of the bowel. Pain was not felt during defecation. This phenomenon was observed on a number of occasions later in the experiment. On December 25 a general dryness of the skin, particularly on the lower and upper limbs, was noticed.

About the middle of January a red ring was noticed around one of the molars of the lower jaw. Since the gums did not bleed and were normal in every other respect, this sign was not considered to be of great significance. At about the same time it was observed that a number of small reddish papules were persistently appearing on the forehead and to a lesser degree on the face. The writer did not have them before, but since this phenomenon is so frequently observed in otherwise healthy people, no attention was paid to it. Later in January a slight loss of appetite was observed.

On January 30 (64th day of the diet) there was a persistent headache during the night. The next evening the writer felt a pain over the region of the heart which lasted most of the night. In the morning there was slight urethral pain during urination. In the evening of the same day there was a noticeable insensitiveness of the tongue. On examination symmetrical ulcerations were found over the base of the tongue and whitish round spots were found scattered widely over its surface, particularly at the edges. These were slightly painful. These symptoms lasted until February second. On the latter day a capillary fragility test was performed by means of a sphygmomanometer cuff on the arm (95 mm. pressure for 15 min.).

There were 94 petechiae for a 1.5 inch circle. At 2 P. M. 80 c.c. of orange juice were ingested. At 5 P. M. the soreness of the tongue considerably receded. Eighty c.c. of orange juice were ingested at 5 P. M. and 7 P. M. At 9 P. M. the tongue manifested only a slight feeling of insensitiveness. There was no soreness at all. The appetite was much better. After that date about 500 to 700 c.c. of orange juice were ingested daily.

On February 7 the general dryness of the skin of the upper parts of the body disappeared. It was still present on the lower limbs. The small reddish papules on the forehead disappeared also.

By February 10 the red ring around the molar had disappeared completely.

On February 13 a little blood appeared in the feces for the last time. There was not a single instance of reappearance of the phenomenon afterwards. The capillary fragility test showed 34 petechiæ to the 1.5 inch circle at 95 mm. pressure.

On February 28 there were 4 petechiæ at 65 mm. pressure (15 min.) and 28 petechiæ at 95 mm. pressure.

Although certain of the phenomena described are not given in the medical literature as deficiency symptoms, the fact that they disappeared completely after the addition of liberal amounts of orange juice, suggests that they might have been the symptoms of so-called "latent scurvy."

Two hundred and ninety-one quarts of milk and 63 pounds of honey were consumed during the twelve weeks of the experiment.

Summary.—A case of an exclusive milk-and-honey diet lasting for three months is described.

The hemoglobin content of the blood was slightly increased. The weight remained practically constant. There was no protein or sugar in the urine. The bowels moved normally. The general feeling was good. The ability to work was not impaired. There was no sluggishness or tiredness noticed.

Early symptoms of vitamin C deficiency were noticed toward the end of the period of observation. They were cured by an addition of orange juice.

Acknowledgments.—The author is deeply indebted to Dr. I. McQuarrie for counsel during the experiment and for many valuable suggestions at the time of preparation of the manuscript. The author expresses his sincere appreciation to Dr. W. A. Riley and Dr. M. C. Tanquary for their interest in the experiment. Thanks are due to Dr. W. B. Combs for making available the milk supply from the University Dairy and to Dr. C. Adams and Dr. R. A. Jensen for hemoglobin determinations.

BLOOD TRANSFUSION*

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FEW surgical procedures now in common use have met with such widespread acceptance and success as blood transfusion. This success has been achieved only after most discouraging initial trials which resulted in the loss of four individuals, three donors and one recipient, the latter, Pope Innocent VIII, who died in 1492 following an attempted blood transfusion. For the next one hundred and seventy-five years, no reference is made in the literature to blood transfusion until, in 1665, Richard Lower successfully transfused dogs by means of goose quills. Two years later Jean Baptiste Denys gave sheep's blood to patients, which resulted in hemoglobinuria. In the succeeding years many novel methods of transferring blood from the donor to recipient were devised and used but the results were so uncertain and so often fatal that the art of blood transfusion became exceedingly unpopular and was banned by decree in several countries.

Uncertainty prevailed until Shattock and Landsteiner during the years 1890 to 1900 conclusively demonstrated isoagglutinins and isohemolysins. In 1906 Jansky and later, in 1910, Moss identified four main groups, into one of which all persons were found to belong. Upon these scientific facts the art of blood transfusion was revived and is today, if properly done, a safe and valuable therapeutic procedure.

Blood transfusion is the transfer of blood from one person, designated the donor, to another individual, the recipient. The blood is obtained from the donor, usually from the cubital veins, except in the immediate direct method as done by Horsley in which the radial artery is anastomosed to the veins in the arm, in which case an arterial supply is necessary. It may be given to the recipient by one of three routes, intravenous, intramuscular, or intraperitoneal. The methods of administration are designated as *direct*, in which the blood is taken from the donor and, without addition of chem-

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icals or contact with the air, is administered to the recipient at once; the *indirect* method, in which various closed containers are used for the collection of blood and from which it is transferred to the recipient; the *indirect citrate* method, in which sodium citrate is added as anticoagulant; *autotransfusion*, in which whole blood taken from the recipient is given intramuscularly for its protein stimulation; *immunotransfusions*, in which blood is given for transfer of immune bodies rather than blood loss, either primary or secondary; and *intraperitoneal transfusions*, in which the citrated blood is given intraperitoneally.

Mention is made of the use of cadaver blood as reported by Russian clinicians. The advantages of the use of cadaver blood are many but careful study of the reports leaves some doubt as to its practical use. It is hoped more will be done to make safe and popular the use of cadaver blood. Gradwohl, in his recent text, reports infection in specimens obtained from cadavers and suggests further study before such procedures be generally adopted.

A review of the literature reveals that blood transfusion has been used for nearly every ailment to which man may fall heir. In general, blood transfusion is indicated whenever a blood loss has occurred from whatever cause and to such an extent as to so alter its quality and quantity that it is unfit to fulfill its physiological duties (Lisrink, 1872). Bernheim, in 1913, advocated blood transfusion in conditions other than dire emergencies following excessive hemorrhage. He referred specifically to pernicious anemia and other anemias and encouraged that transfusion be done before permanent and irreparable damage occur to the myocardium and nervous system.

The high mortality accompanying the early transfusions made it a procedure of emergency only and in many cases the patient succumbed in spite of the transfusion rather than because of it. Today, with a minimum of reactions and less than 0.39 per cent mortality, the indications for transfusions are increased. Excepting the autotransfusions of dermatology and the immunotransfusions, more frequent in pediatrics, the greater number of blood transfusions are used in surgical procedures. Most dramatic of all recoveries from transfusion of blood are in those who have suffered a sudden blood loss

from trauma or surgical operations, but equally important are those secondary anemias, from whatever cause, that demand blood transfusion.

At the More Hospital and Clinic a blood transfusion is not usually indicated unless the r.b.c. is less than 3,500,000 and the hemoglobin 50 per cent or less. Surgical patients with lower readings are transfused before operation. If in a case of secondary anemia there is no evidence of improvement within a week, a blood transfusion is advised. A donor is made available to be used if necessary immediately following operation. A registry of donors, who have been previously grouped, whose Wassermanns are negative and who, in so far as it is possible to determine, are free from diseases, is maintained. From this group of forty or more we can usually find a donor within a short time, if the relatives do not match or the emergency does not warrant a delay.

Some contraindications to intravenous transfusions have been found, namely, myocarditis, pneumonia, laryngeal diphtheria complicated with bronchopneumonia, and, until the work of Mosenthal and Ashe, chronic nephritis.

Landon, in a series of 100 cases of acute infectious diseases, including diphtheria, scarlet fever, measles, pertussis, poliomyelitis, typhoid fever, streptococcic septicemia and post-measles encephalitis, noted that blood transfusions were of value in preoperative scarlet fever complications, such as mastoiditis, adenitis, etc., in broncho-pneumonia following pertussis and in cases of anemia following protracted illnesses.

From 1900 to 1910 blood transfusion was done on the basis of three main groups. In 1906 Jansky recognized a fourth group but did not make known his findings until after Moss in 1910 had reported his fourth group. The groups are identical except that Group I Jansky corresponds to Group IV Moss and Group IV Jansky is Group I Moss. Reactions continued in spite of apparent proper matching and, in 1923, Guthrie and Huck recognized more than four groups and accounted for some of the post-transfusion reactions. The additional groups of Guthrie and Huck are uncommon and represent but a small percentage of all persons.

For the purpose of more general and accurate understanding, a universal classification has been developed in which the four main groups are designated as O-A-B—and A.B. corresponding

to Groups I, II, III and IV Moss; IV, II, III, I—Jansky. In grouping recipients it is necessary to specify which classification is followed. We have adopted the Moss classification in our work and, unless otherwise so stated, all references made to groups will be according to that classification.

Various statistics reveal the percentages in the respective groups as follows: Group I—2.5 per cent; Group II, 40-42.5 per cent; Group III, 9-15 per cent; and Group IV, 43-43.5 per cent. About 83 per cent belong to Groups II and IV. There is a familial tendency for blood groups to appear in accordance with Mendel's law and the difference in group percentages might be due to family groupings by different workers.

The particular blood group to which an individual belongs is not well established until one year of age. Blood groupings are made possible by the presence of isoagglutinins and isohemolysins. In its practical application it means that it is possible to determine in advance the compatibility of the proposed donor's blood with the recipient's blood. This is easily accomplished in the following way: Serums of known Groups II and III are used to test the blood of donor and recipient. If there is agglutination with serum of both groups the individual belongs to Group I; if there is agglutination with Group III serum only, he belongs to Group II; if the agglutination occurs with Group II serum, he belongs to Group III; and if there is no agglutination, he is in Group IV. The apparent facts from these results make Group IV appear a universal donor and Group I a universal recipient. When an emergency presents itself, these conclusions may be accepted and a universal donor used in the absence of one more accurately matched. But far more desirable is the donor whose serum upon testing does not agglutinate the cells of the recipient. Under no circumstances must the serum of the recipient agglutinate the cells of the donor. In a dire emergency, however, because of the dilution of the serum of the donor, it is not entirely necessary that the serum of the donor does not agglutinate the cells of the recipient. This evident exception is possible because, even though agglutination occurs, hemolysis does not always take place. Ninety-seven per cent of bloods contain isoagglutinins and only 25 per cent con-

tain isohemolysins. It is therefore possible for agglutination to occur without hemolysis but hemolysis without agglutination does not occur.

It is our practice to insist on perfectly matched donors, that neither serum produces agglutination of the cells of the other, as recommended by Brooks, Burwell, Copher, Doris, Stow, Gradwohl, Guthrie and Hucks, Arrendell, Cutting and others.

Osborne, Allen and Bruce advocate the use of a universal donor for Group II recipients, inasmuch as fewer reactions result than from Group II donors. They recommend the use of Group IV serum in addition to that of Groups II and III in typing recipient, assuming that serums II and III will not deteriorate at the same time. They state there are two groups in Group II, and others, who agree, classify them as fast twos and slow twos. Added precaution must prevail when the recipient is a Group II.

In those cases where more than one transfusion is necessary, always match the proposed donor before giving a second transfusion even though he has previously matched perfectly. Cross matching is of greatest importance in those requiring multiple transfusions. It is far better to transfuse with safety, for many times recovery may hang in the balance and even a slight reaction may convert potential recovery into a fatality.

Emergency measures, intravenous saline, and glucose, gum acacia, and the medications for treating shock, are always more readily available than blood for transfusions and can be given more promptly. Blood, unless it is compatible, should not be given. There must be no agglutination and no attending reaction if the transfusion accomplish its purpose. A patient, whose condition presents an emergency requiring transfusion, demands, all the more, compatible blood.

Blood transfusions should be more generally used and not only when all else has failed. While it is, to the laity, an emergency procedure, a warning goes with the urge for more blood transfusions in that there is a tendency to overlook factors of safety in all therapeutic measures which gain widespread usage.

A blood transfusion is a surgical procedure and must be attended by the same skill and aseptic technic that makes for success in any operation. Our procedure of choice is the citrate method. We have had no reactions of

importance. There are those who, while not condemning the indirect citrate method, believe the direct method to be superior because the blood is given unmodified. But there are advantages to the citrate method which appear to warrant its use. (1) It is extremely simple; (2) the patient need not be moved or become an integral part of an operation; (3) the results are equal to those of the direct method; (4) a citrate transfusion requires less skilled help; and (5) it can be done with little or no reaction, if done correctly.

No attempt is made here to condemn any other method of blood transfusion so long as it is done without reaction and with good results. A reaction is more than a rise in temperature and is accompanied by some other complaint such as chill, pain, dyspnea, urticaria, hemoglobinuria, jaundice, shock, or anaphylaxis of some degree.

The errors of blood transfusion and the cause of post-transfusion reactions can be found usually in faulty grouping. Faulty grouping is due most commonly to faulty serums; either that they have deteriorated or there has been some sudden reduction in titre. It is also due to hurried laboratory examination and for that reason it is advisable to wait an hour before concluding there is no agglutination. Embolism, infection, syphilis or malaria, delayed reaction or too rapid administration of blood to the recipient, are errors which can be controlled by technic and care and need not occur. Certain drugs, anesthesia, radiation with x-ray and terminal progressive toxemias may alter the blood grouping and make perfect matching with a donor impossible. Under such circumstances a transfusion might easily be a dangerous procedure.

When a donor is properly matched, has been found to have a negative Wassermann and is free from other communicable diseases, his arm is prepared as for any surgical procedure, usually in the operating room. At the same time the arm of the recipient is similarly prepared and covered with sterile drapery. All utensils and glassware are thoroughly rinsed in sterile 2 per cent sodium citrate made of distilled water and autoclaved with the other supplies for forty-five minutes at 15 pounds pressure. The tubing and

all needles are washed with citrate solution. Nothing comes in contact with the blood that is not previously washed in sterile 2 per cent sodium citrate. An amount of 2 per cent sodium citrate equal to 10 per cent of the proposed amount of the transfusion is placed in a graduate and into this is withdrawn the blood from the donor. The mixture is stirred to prevent clotting. The citrated blood is then filtered (although some doubt its necessity) through several layers of sterile gauze and given by gravity into the vein of the donor, slowly, requiring in all about thirty minutes for the entire procedure. The needles should be 15 gauge and the tubing, previously prepared by washing in cold water for several hours, connects a gravity chamber with a T syringe. Saline is placed in the gravity tube and chamber and all air removed, the needle inserted in the vein and, when good flow is established, the citrated blood is added. Normal saline is again added when the blood is leaving the gravity tube and thus none is lost. There are some who object to sodium citrate because of its effect on the platelets. It is, however, eliminated rapidly, as determined by Salant and Wise, and, contrary to some opinions, it has no effect on the red blood cells, as determined by Mellon, Hastings and Casey. Lewisohn has found that five grams of sodium citrate may be given with safety. Gichner, after his investigations, found citrated blood was utilized quite as well as unmodified blood and recommended its use.

Ashly by a series of unique observations, determined the life of a transfused corpuscle to be thirty days or more and also found that the beneficial results were due to the transfused corpuscles themselves, rather than to any stimulation of the hematopoietic system. There is no breaking down of the cells of the transfused blood in successful transfusions.

To these observations must be added the clinical results which, in our experience and the experience of others, are satisfactory in transfusions for massive hemorrhage, secondary anemias in preoperative and postoperative patients, thrombocytopenic purpura, infections, ulcerative colitis and bleeding gastric and duodenal ulcers.

CASE REPORTS

KEROSENE POISONING*

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THE statement that ingestion of kerosene is dangerous and may prove fatal would probably be received with surprise by most persons, including many physicians; yet during the past few years at least 120 hospitalized cases, with five fatalities from this cause, have been reported in medical journals, and from the nature of the cases, and the sources of reports it seems fair to assume that many more have gone unreported.

Clinical and laboratory findings in cases of kerosene poisoning as reported are strikingly uniform. They are chiefly as follows:

1. All fatalities occurred in children ranging in age from 12 to 20 months.
2. All fatalities occurred in from 3 to 48 hours, nearly all in 8 to 18 hours after ingestion of kerosene.
3. All fatal and many non-fatal cases developed typical signs and symptoms of pneumonia.
4. Chief early signs are marked drowsiness or actual coma, cyanosis, occasionally convulsions.
5. High fever, rapid pulse and rapid respiration develop in a few hours.
6. Laboratory findings were not especially significant. Traces of sugar and acetone were present in the urine; leukocytosis, especially in cases with signs of pneumonia.
7. No satisfactory therapy has been devised. Stimulants, such as atropine, caffeine, carbon dioxide, plus gastric lavage or emetics, are suggested, but none seems to be of much value.

The following case report is given in considerable detail because it is almost identical with all cases reported and, therefore, gives an accurate picture of the condition:

Case Report

The case is that of a female child, one year of age, brought to my office at 6 p. m., April 9, 1931. About an hour previously she had drunk from a glass containing kerosene. At first she seemed unharmed but after about half hour became drowsy. When seen, she was in a comatose condition resembling profound sleep and was slightly cyanotic. Her pulse was strong and not especially rapid. A tube was passed at once and the stomach washed, about two quarts of water being used. Some undigested food and a quantity of kerosene were obtained, the latter in sufficient quantity to collect in drops on the surface of the wash water. Two drams of magnesium sulphate in solution was poured into the stomach and left.

*Read before the annual meeting of the Southern Minnesota Medical Association, Albert Lea, Minnesota, August 30-31, 1936.

The patient was sent at once to the University Hospital, arriving at 6:45 p. m., one and three-quarters hours after drinking the kerosene. The remainder of the report is taken from the hospital record.

On admission at 6:45 p. m., the patient appeared semicomatose. Pupils reacted to light, but were dilated; respiration, 40; pulse, 160; skin cold and clammy. Gastric lavage was done, the washings having the odor of kerosene. At 6:55 p. m., $3\frac{1}{2}$ grains caffeine sodium benzoate were given. At 7:00 p. m., heat was applied to the abdomen and soap suds enema given. At 8:00 p. m., an enema of 2 per cent sodium bicarbonate was given, also mineral oil, 2 ounces in a half ounce of milk by gavage. The patient responded when spoken to; respiration was very rapid; hemoglobin, 81 per cent; leukocytes, 6,300; p. m. n., 26 per cent; lymphocytes, 70 per cent; monocytes 4 per cent; temperature, 106.2; pulse, 160; respiration, 60.

At 3 a. m., April 10, the baby was on the verge of convulsions, the pupils more widely dilated, respiration very rapid and the patient going into spasms when touched. She was very cyanotic. At 3:45 a. m., 20 grains of chloral hydrate and a cold sponge bath were given. At 4:15 a. m., oxygen was started. At 9:00 a. m., physical examination showed bronchial breathing in the left lower chest and dullness over the right base. At 9:45 a. m., an x-ray diagnosis of bronchopneumonia was made. At 10:31 a. m., the baby died—seventeen hours after ingestion of kerosene.

Detailed autopsy report showed all findings to be normal except the following:

1. Acute bilateral bronchopneumonia.
2. Hemorrhagic congestion of large bowel.
3. Cloudy swelling of liver and kidneys.

The following statement is quoted from the autopsy report: "The bronchi were exposed and traced out and showed no obstruction, but were slightly congested."

Review of Literature

The literature here reviewed includes that available through the "package library" service of the Library of the American Medical Association plus articles and abstracts published in the Journal of the Association since 1931.

In 1926, Barbour¹ reported four cases seen in a six-year period with one fatality. He reported finding traces of sugar in the urine. Following publication of Barbour's report, several fatalities were mentioned in inquiries sent to and published in the "Queries and Minor Notes" section of the Journal of the American Medical Association.

In 1933, Higgins² reported in detail a rapidly fatal case with findings practically identical with those given above.

McLean³ stated, in 1933, "In a local hospital during the past five years there have been seventeen admissions of young children who drank kerosene. There were three deaths and several of the children were acutely ill with high temperatures."

The most extensive and detailed paper noted is that by Waring,⁴ who, in 1933, reported twenty-three hospital admissions with two deaths. Waring also reports experimental study on dogs in which death followed

introduction of kerosene into the trachea but did not follow when it was introduced into the stomach, and concludes that human deaths have been due to inspiration rather than ingestion of kerosene.

Finally, in 1934, Nunn and Martin report sixty-five hospital admissions with six deaths from the effects of kerosene and, in addition, seven cases with two deaths from ingestion of gasoline.

Comment

From the scattered sources of reports it seems logical to assume that only a small percentage of kerosene deaths have come to publication. This seems the more likely to be true in view of the extremely short duration of these cases, and the consequent probability that many such cases remained in the care of busy family physicians who have not published their records.

Since no effective therapy is available the only means by which these deaths may be avoided seems to be to inform the public of the existence of the menace and the need for care in protecting children from access to this substance, and of the potential danger from its still widespread use as a "household remedy" in colds and croup.

The assumption that kerosene deaths are produced by inspiration rather than by ingestion of kerosene is logical but unproved. It is, however, not pertinent to the problem, the main point being to recognize the danger and attempt to avoid it.

An interesting sidelight was furnished by a story told the author by a farmer living at Hamel, Minn. This man had been repairing a kerosene motor and left a pail of kerosene standing in the barnyard. A cow drank from the pail, taking approximately a gallon of the kerosene. After drinking she raised her head, looked about in a dazed manner, staggered a few steps backward, fell, and died a few minutes later. The carcass was removed some distance and left to be buried next day. During the night a dog belonging to the farmer ate of the carcass and was found dead beside it next morning.

Summary

1. Kerosene is a dangerous poison which produces quick death when ingested by young children.
2. All patients in reported fatal cases died of pneumonia.
3. Where ages were given, fatal cases were in children from twelve to twenty months of age.
4. Deaths occurred in from three to forty-eight hours after ingestion of kerosene.
5. Laboratory study yields no significant information.
6. The assumption that pneumonia is due to inspiration of kerosene, though reasonable, is not satisfactorily substantiated.
7. No means are available for preventing deaths from ingestion of kerosene except education of parents as to the danger.

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ARTIFICIAL FEVER IN THE TREATMENT OF MENINGOCOCCUS INFECTION*

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THE view that heat has a remedial effect on certain disease processes in the body dates back, according to Neyman,² to early sixteenth century attempts to cure syphilis. The introduction of malaria in the therapy of neurosyphilis by von Jauregg⁴ in 1918 greatly stimulated interest in the use of fever as a therapeutic agent in infectious states.

Although the temperature elevations occasioned by foreign protein injections may have occasionally caused benefit, the development of improved physical means for producing accurately controlled and sustained fever brought about real renewed hope in the effective application of this agent.

Fever, either alone or as an adjunct, has, of course, been most successful in those infections whose causative organisms are especially susceptible to heat. Obviously, if the thermal death point of a pathogenic organism is lower than that of surrounding tissue cells fever therapy can produce a selective beneficial effect. Boak, Carpenter and Warren¹ have established the thermal death time in vitro of a number of organisms at temperatures of 41° and 42° C. (105.8° to 107.6° F.) and have demonstrated that the *Spirocheta pallidum* and the gonococcus are among the most thermo-labile.

Sheard³ has shown experimentally that thermal changes are different in various tissues following systemic application of radiotherapy. Muscle tissue is affected more than subcutaneous tissue and of those measured the thermal increase is greatest in intra-articular tissue. His experiments indicate the possibility of raising the temperatures, especially of deep and more conductive tissues.

The meningococcus, which resembles the gonococcus in many respects, apparently has an affinity for the blood, for articular surfaces and for the meninges.

The low thermal death point of the meningococcus and its habitat in tissues most affected by systemic fever induction, together with the all too common lethal manifestations of the organism prompted speculation on the possibility of affecting it in vivo by means of heat. The following case afforded an opportunity to witness such a possible effect.

*From the Department of Pediatrics, University of Minnesota, with the cooperation of Dr. Malcolm Cook, head of the Fever Therapy Department.

CASE REPORTS

W. D., a white male, three and one-half years old, was admitted to the hospital April 27, 1936, because of ophthalmia, painful joints, fever (103°), stupor and eruption on the face and extremities. A head cold had

pain for a few days. Further cultural studies and agglutination tests of the organism isolated from the patient's blood revealed its true identity as a meningococcus.

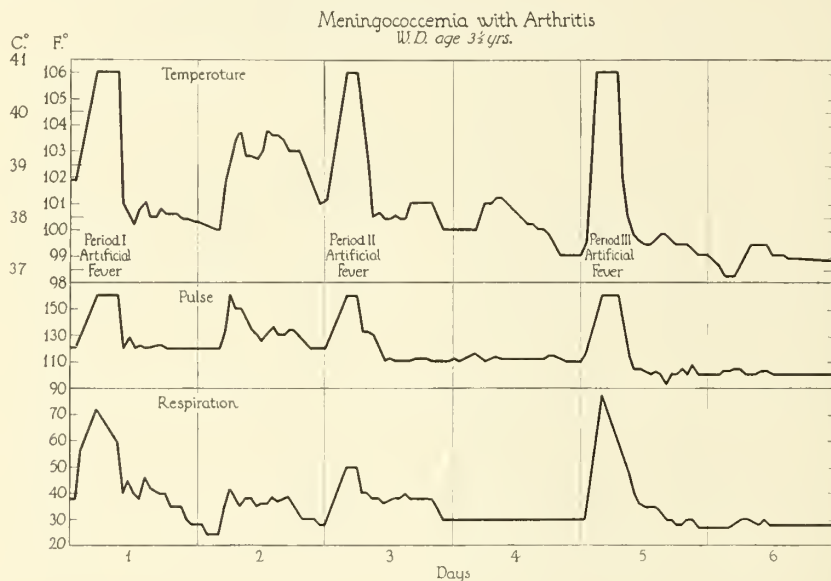


Fig. 1.

preceded these symptoms by one week. On admission the boy appeared very ill. There was profuse mucopurulent discharge and some injection in both eyes, more marked in the right. There was some inflammatory reaction and discharge apparent in the nose and throat. The ears, lungs, heart and abdomen were essentially negative. The extremities showed tender, swollen carpophalangeal and interphalangeal joints on the left and tenderness in the right wrist. The right knee was tender and pain was extreme on attempted motion. The left great toe became swollen and tender on the second day. The skin of the face, buttocks and extremities was covered with many dark red, maculopapular lesions that could be felt on palpation but were not hard. A few were petechial and did not blanch on pressure. Although there was apparently no involvement of the nervous system at this time, he developed attacks of unconsciousness on the third day, associated with twitching of the right hand and left leg. No neck rigidity or signs of meningeal irritation developed. Laboratory findings—Hgb. 50 per cent, w.b.c. 18,650, Diff.: p.m.n. 66 per cent Lymph. 34 per cent, Mono, 0. X-ray of the chest and a six foot plate of the heart were negative. The urine was negative. Eye smears showed Gram-negative intra- and extracellular diplococci morphologically resembling gonococci. The blood culture was first reported to be a "probable gonococcus."

Further cultural investigation of the organism was requested and the boy was subjected to artificial fever of 106.5° for a period of nine to ten hours on each of three succeeding days, as illustrated in the accompanying chart. He made a very prompt recovery and has remained well since, except for slight residual joint

Three days following this boy's recovery his two-year-old sister was admitted with symptoms of meningitis, and meningococci were found in her spinal fluid. These organisms were definitely agglutinated by the serum of her brother's blood in dilutions of 1-320 and slightly so at 1-640. His serum also agglutinated meningococci recovered from an unrelated case of meningitis. Massive intravenous therapy with meningococcus antitoxin effected a complete recovery in the case of the girl.

The observations in the above reported case, together with the knowledge that the thermolabile meningococcus, which tends to involve tissues that are relatively more affected by systemic heat, has opened the question of whether or not fever may be an effective adjunct in combating epidemic meningitis. Controlled studies are now in progress to determine whether this preliminary observation may confirm such a conjecture.

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CLINICAL PATHOLOGIC SEMINAR

Conducted by E. T. BELL, M.D.

Department of Pathology, University of Minnesota

Minneapolis

Multiple Myeloma

Case 33.—A woman, sixty-four years old, in the summer of 1935 began to have generalized tired feeling which became progressively worse. In the fall she began to have pain in the back and in the spring of 1936 the pain began to migrate around under the costal margins; she had lost about 30 pounds in weight. Previous history gave negative findings except for cholecystectomy and appendectomy.

On admission, March 25, 1936, her eyes reacted to light, sluggishly; the heart was enlarged to the left, with a systolic murmur at the apex; slight edema of the ankles; a band of verrucous plaques around the waist; normal tendon reflexes.

Urine: specific gravity, 1010; small trace of albumin; otherwise normal. Blood: hemoglobin, 36 per cent; 2,100,000 red cells, 7,800 white cells; normal differential; the red cells showed hypochromasia.

X-ray of the lungs showed bronchitis or upper respiratory infection with possible slight bronchopneumonia. X-ray of the gallbladder was interpreted as showing the gallbladder either diseased or absent. Stomach and duodenal cap showed a normal distribution of barium meal. Spine, pelvis, and shoulder girdle showed nothing except slight hypertrophic arthritis of the lumbar and thoracic spine. The feces showed no blood, ova or parasites. The blood Wassermann reaction was negative. Spinal fluid: cell count, less than 1; Nonne, faint cloud; Wassermann negative; gold curve, 0111100000. Basal metabolic rate, —16. The temperature during the stay in hospital showed uniform rise each afternoon to between 99.5° and 100°. During the stay on hospital about the only clinical objective finding in the patient was pain; there was no disturbance of locomotion; toward the end there was some mental clouding and stupor. Anemia was treated with iron and some liver. On April 6, hemoglobin was 43 per cent; red cells 2,440,000, white cells 5,500; one normoblast was found in the smears; polymorphonuclear granules were toxic; the differential white count was normal.

On May 4 another white count showed 5,800 cells with 46.5 per cent polymorphonuclears, 44.5 per cent lymphocytes; hemoglobin, 48 per cent; no reticulocyte counts were done.

The patient was dismissed on May 17 and readmitted May 18; pulse irregular, lips cyanotic; she was irrational and confused and there was marked dyspnea. Terminal elevation of temperature to 104°. Death, May 20, 3:59 p. m. No definite clinical diagnosis was made.

Postmortem examination. The body was somewhat obese; the subcutaneous fat over the anterior abdominal wall was about 4 cm. in thickness. The pleural, pericardial and peritoneal cavities were normal. Both appendix and gallbladder were absent. The heart weighed 380 grams; the coronary arteries showed only minimal sclerosis; no disease except, perhaps, slight hypertrophy of the left ventricle. The right lung weighed 430 grams, the left, 375 grams; a small amount of bronchopneumonia was demonstrated in the left lower lobe; otherwise the lungs were normal.

The spleen was enlarged, weighing 340 grams. The pulp was firm and dark; no other gross changes.

The liver weighed 1800 grams; it showed no changes except that the parenchyma was decidedly pale. The esophagus, stomach, duodenum and jejuno-ileum showed nothing of note but the mucosa of the entire colon was studded with small, superficial ulcerations, 1 to 2 mm. in diameter; there was no gross blood in the colon. The pancreas showed no changes and the adrenals appeared normal. There was no disease of the kidneys or of the bladder. Both uterine tubes were retort-shaped and somewhat dilated in their distal portions; the ends were sealed off; this appeared to be an old chronic salpingitis of low intensity. The ovaries showed no disease.

The aorta showed a minimal amount of atherosclerosis. The thyroid was somewhat small but of normal consistence. The parathyroids were normal. No disease of any kind was found in the brain. The pituitary gland was normal. There was no disease of the breasts.

The bone marrow of the ribs was pale and fatty.

On section through the first lumbar vertebra it was noted that the spongy part of the bone contained a large number of whitish, soft nodules from 1 to 5 mm. in diameter. Longitudinal section of a rib showed similar whitish nodules in the marrow. There were no large lymph nodes in any part of the body.

Microscopic examination of the vertebra and ribs showed that the whitish nodules were composed of myeloid cells of the plasma cell type; the nodules were composed of compact masses of these plasma cells and there were numerous plasma cells between the masses. The spleen was also infiltrated with plasma cells.

Comment.—The bone marrow presents a typical picture of multiple myeloma of the plasma cell type but the infiltration of the spleen with these cells is very unusual in multiple myeloma. The diagnosis is multiple myeloma but the interpretation of plasma cell leukemia is possible.

Primary Hypertension

Case 34.—A man, forty-seven years of age, was admitted to the hospital, April 23, 1936. In January, 1936, he first experienced severe pain in the right flank which was dull in character and situated in the right lumbar region. The pain then became sharp and colicky with some radiation anteriorly to the abdomen and into the groins. Associated with the pain, there was some hematuria and frequency; the patient passed a number of clots of blood. Shortly after this he was examined at the outpatient department. He gave a history of having had high blood pressure for about two years; this was associated with marked headaches in the frontal region and attacks of dizziness.

On admission to the hospital, a furuncle was noted on the left side of the nose. Hemorrhages were noted in the fundi. The lungs showed some dullness laterally and posteriorly over the bases with crepitant rales over the same areas; there was normal tactile fremitus. Blood pressure, 230/134; pulse, 80. Slight enlargement of the left ventricle was noted and a systolic murmur was heard over the apex. The abdominal examination revealed no positive findings. Hemoglobin 62

per cent; red blood cells 3,400,000, white cells 8,800; polymorphonuclears 88 per cent; lymphocytes 20 per cent. On May 7, nonprotein nitrogen was 103.4 mg.; May 19, it was 262.5 mg.

The patient became restless and apprehensive and had some difficulty in breathing; mucus collected in the respiratory passages so that frequent aspirations were necessary. He became totally disoriented, developed dyspnea, cyanosis and orthopnea in marked degrees. He became unconscious on May 19, and died on May 20. Intravenous urography, on May 2, showed no dye entering either pelvis.

Postmortem examination: There was no edema; about 500 c.c. of clear fluid in the peritoneal cavity; about 1000 c.c. of clear fluid in each pleural cavity; the pericardial cavity contained a small amount of fibrinopurulent exudate. The heart weighed 585 grams; it showed marked hypertrophy and dilation of the left ventricle; no disease of the valves or of the coronary arteries.

The right lung weighed 750 grams, the left 550 grams; rather extensive bronchopneumonia was found in the dependent portions of the lower lobes, especially the right. The spleen weighed 160 grams and showed definite chronic passive congestion. The liver weighed 2000 grams and showed moderate chronic passive congestion. The adrenal glands were entirely normal. There was no disease of the gallbladder, gastro-intestinal tract or pancreas.

The right kidney weighed 105 grams, the left 110 grams. The surfaces were fairly smooth. On section, cortices were studded with pale and hemorrhagic areas. The bladder and genital organs were normal. The aorta showed atherosclerosis about grade 2. The brain was not examined.

Microscopic examination of the kidneys showed marked involvement of all the small arteries and arterioles; these vessels were extremely narrowed because of intimal thickening of the fibrous type; the appearances were typical of hypertension with renal insufficiency (the so-called malignant hypertension).

Comment.—This is a fairly typical case of primary hypertension which had been present two years or more and terminated in a rapidly developing uremia. It is to be distinguished from chronic glomerulonephritis.

Acute Gangrenous Pancreatitis

Case 35.—The case is that of a man, forty-five years old, who, about May 22, 1936, had an acute attack of pain, accompanied by nausea but no vomiting. The pain was across the upper abdomen, later localized in the right upper quadrant. Enema and icebag gave relief. Later in the day the pain returned; he was given a hypo with some relief and sent to hospital. He had had similar attacks but not so severe; had been told by a doctor that he had gall and kidney stones. He had occasional burning pain in the epigastrium.

On May 22, he entered the hospital at 10 p. m. by ambulance. Temperature was 98°; pulse, 90; respirations, 20. He was unable to void. He was given a low enema and icebag; following the use of the icebag, in five minutes, he experienced nausea with a small emesis. There was boardlike rigidity across the upper abdomen and down to the umbilicus with some tenderness to pressure in the left upper quadrant; markedly tender at McBurney's point. Immediate operation was done; gallbladder and appendix removed; the gallbladder showed advanced chronic cholecystitis with about fifteen fairly large stones and some smaller ones. He received the usual postoperative care with nasal suction, glucose 5 per cent, intravenous-

ly, but on the second day became restless and vomited; temperature was 99.2° to 100° by axilla. He perspired profusely, almost constantly. On the third day, the first specimen of urine showed albumin, +++; 2 to 5 hyaline and 1 to 4 granular casts per low power field; 2 to 6 red blood cells per high power field. Blood urea, 53.2 mg.

He complained of a feeling of fullness in his stomach and slight pain. The next day he complained of backache, grew very drowsy and slept soundly. He continued to complain of a feeling of fullness, was tired and drowsy, vomited greenish fluid on the 27th. On the 28th he became delirious; pulse, 120; respirations labored; very drowsy but restless. By evening he was stuporous or irrational. On the 29th, the blood urea was 142 mg.; creatinin, 8.8 mg; temperature going to 102°. From this time he was irrational part of the time, drowsy part of the time, with some nausea. On May 30 there was some twitching of the muscles of the face, arms and legs. Pulse was 128 and irregular. On May 31, there were twitchings all over the body; nausea; temperature, 103°; blood pressure, 130/98. Vomit smelled of urine. He was given coramin, morphin and pituitrin with glucose intravenously and almost constant nasal suction. On June 1, the pulse went down to 88; respirations, 20; temperature, 103.4°; Cheyne-Stokes respiration. Death occurred at 9:20 a. m., June 1.

Postmortem examination: There was no edema or jaundice; recent right rectus incision, partially open and draining. Peritoneal cavity contained 300 c.c. of cloudy purulent fluid; all of the peritoneal surfaces, where adipose tissue was present, were studded with small areas of fat necrosis, up to 5 mm. in diameter. There was no disease of the heart, lungs or spleen. The liver weighed 1700 grams and had a normal color; the bile ducts were all patent and there was no dilation; the gallbladder was absent; there were stones in the cystic duct. The gastro-intestinal tract showed no disease.

The pancreas was enlarged and grayish black; for the most part it was gangrenous; there were numerous large areas of fat necrosis about the pancreas. The pancreatic duct opened in a common chamber at the ampulla with the common bile duct but no stones were found in this region and the common bile duct was not distended. The kidneys and bladder were normal. Microscopically, the kidneys were normal.

Diagnosis: acute gangrenous pancreatitis with general peritonitis.

Comment.—Acute pancreatitis of this type is associated with cholelithiasis in a majority of cases. Apparently, the symptoms from the beginning of the illness were due to the pancreatitis and not to the gallbladder.

One theory of the origin of acute pancreatitis is that a gallstone is lodged in the ampulla and this results in forcing bile up into the pancreatic duct, causing pancreatitis. This theory accounts for the frequent association of gallstones with pancreatitis. However, in most instances, nothing is found at postmortem to prove that a stone did lodge in the ampulla. It is conceivable that stones might lodge temporarily and cause diversion of bile into the pancreatic duct and finally be passed into the duodenum.

Influenzal Meningitis

Case 36.—A baby girl, sixteen months of age, was admitted to the hospital on June 9, 1936. She had been well until June 7, when she vomited several times and became very drowsy. On June 8, the drowsiness per-

sisted; a physician was called, who observed stiffness of the neck; the child objected to being picked up. Spinal puncture on this date showed a cloudy spinal fluid.

On admission, June 9, the child was well nourished and lay quietly in bed with closed eyes; neck rigid; anterior fontanel tense; pharynx reddened; Kernig sign positive. The urine showed no abnormality. Blood; hemoglobin, 100 per cent; white cells, 42,000; polymorphonuclears, 85 per cent, lymphocytes, 15 per cent. Spinal fluid, June 9, showed 8000 cells per cubic millimeter of which 90 per cent were polymorphonuclears and 10 per cent, mononuclears. On June 10, 6,800 cells, with 81 per cent polymorphonuclears; on June 11, 8,300 cells with 86 per cent polymorphonuclears. Smears showed small Gram-negative pleomorphic organisms in coccoid and rod shapes, the organisms being identified in smears of the spinal fluid and also in cultures. These were recognized as influenza bacilli. The organisms were grown in culture and found to be influenza bacilli; they were aggluti-

nated with anti-influenzal serum. Anti-influenzal serum was given intraspinally and intravenously. On June 12, no spinal fluid could be obtained by lumbar puncture; cisternal puncture was made and a small amount of fluid was obtained. The patient became cyanotic, respiration slow and labored. Oxygen failed to relieve the cyanosis. Death occurred, June 13.

Postmortem: No disease was found in any of the organs in the thorax or abdomen. Upon removing the dura mater, a greenish rather thick layer of fibrinopurulent exudate was found, covering the greater part of the cerebellum and the bulbar portion of the spinal cord.

Diagnosis: Influenzal meningitis.

Comment.—Meningitis due to the bacillus of influenza can be distinguished from meningococcic meningitis only by identification of the organisms in the spinal fluid. Frequently this disease is not preceded by an upper respiratory infection.

The Nomenclature of "Male Hormones"

The Council on Pharmacy and Chemistry reports that the investigations on the male hormones have advanced to the point at which three chemically pure substances have been obtained from urine and testis tissue; a number of related compounds have been obtained by modifying these substances or by synthetic degradation studies on the sterols and bile acids. The physiologic potencies of the naturally occurring compounds and of some of the other substances have been determined. On the recommendation of the Advisory Committee on the Nomenclature of Endocrine Principles, the Council on Pharmacy and Chemistry adopted the following terms: (a) *Androsterone* to designate the chemically pure hormone $C_{19}H_{30}O_2$, melting point 178 C., obtained from urine (International unit 100 micrograms as assayed by comb growth response in the capon). (b) *Dehydro-androsterone* to designate the chemically pure hormone $C_{19}H_{28}O_2$, melting point 148 C., obtained from urine (capon unit approximately five times the dose of androsterone). (c) *Testosterone* to designate the chemically pure hormone $C_{19}H_{28}O_2$, melting point 154 C., obtained from testis tissue (capon unit from one-tenth to one-sixth the dose of androsterone). (d) *Androgen* to designate substances possessing masculinizing activity. Urinary androgens, testicular androgens or androgenic substances from plant or other sources may or may not contain androsterone, dehydro-androsterone or testosterone. Although the international unit is based on comb growth response in capons, it should be emphasized that this method of assay does not necessarily express the quantitative physiologic activities of different preparations on mammals. Therefore it is highly desirable to determine the physiologic activities of new pure or crude preparations by assays on mammals as well.—(J.A.M.A., July 18, 1936, p. 210.)

The Nomenclature of Estrus-Producing Compounds

The Council on Pharmacy and Chemistry reports that there are at least seven naturally occurring estrogenic substances that have been isolated in a crystalline condition. As the result of investigations by Butenandt, Cook, Doisy, Marrian and their respective associates the structure of these and related compounds has been definitely established. Two systems of nomenclature have been proposed: one by Girard using the root "folli-" with suffixes to indicate the nature of the compounds; the other by Adam and his collaborators using the root "œstr-" with certain modifications. In view of the importance of Edgar Allen's investigations in opening up the field of the follicular hormone and of Doisy's contributions in isolating the first crystalline estrus-producing compound and the further fact that the Council has approved theelin as a common name, the Advisory Committee on the Nomenclature of Endocrine Principles considered a proposal to retain "theel-" as the root for the names of the estrus-producing compounds. However, in view of the fact that the system of nomenclature devised by Adam and his collaborators has been fairly widely adopted among investigators, it appeared inadvisable to supplant this system even though the new system based on "theel-" was simpler and more nearly in accord with the nomenclature for the androgens. Accordingly, the Council, on the recommendation of the Advisory Committee on the Nomenclature of Endocrine Principles, decided (1) to adopt the system of nomenclature based on the root *estr-*; (2) to retain *theelin*, *theelol* and *dihydrotheelin* as synonyms for the compounds known in the aforementioned system as *estrone*, *estriol* and *estradiol* respectively; and (3) to adopt the term *estrogenic* to describe those compounds or extracts which in addition to their other physiologic properties produce estrus, and to adopt the noun *estrogen* as the collective term for all the substances having these properties. (J.A.M.A., Oct. 10, 1936, p. 1331.)

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

Volume 19 DECEMBER, 1936 Number 12

Center For Continuation at the University of Minnesota

THE dedication conference of the Center for
Continuation Study of the University was
held November 13 and 14, with an appropriate
program participated in by faculty and guest
speakers. We are indebted to President Coff-
man, as the plan for the Center is due to his
conception that the University should foster
training facilities for leaders and members of
the professions throughout the state. The for-
mation of this Center is the result of the recogni-
tion of the educational duty and privileges of
the State University toward members of such
groups which may be licensed by the state and
which may or may not be alumni of the Univer-
sity. It, in no way, replaces but supplements

the training offered by the General Extension
Division of the University, of which Dr. R. R.
Price is the director.

The building is a worthy addition to the cam-
pus. Funds for its construction were supplied
in part by the Federal Public Works adminis-
tration. It contains very adequate living quar-
ters and conference rooms and these facilities
should aid in the effectiveness of refresher
courses that are necessarily limited in duration.
Particular benefit would seem to accrue to the
medical profession. Periodic attendance upon
courses planned to cover newer developments
will enable practicing physicians to keep abreast
with current medical progress right at the Uni-
versity. Dean Diehl is greatly interested in the
formulation of plans for courses at the Center,
the first of which will be held early in 1937.
Further details will be available later.

Professor Harold S. Benjamin is Director
of the Center and is thoroughly competent to
aid in the execution of the plans for the various
groups. The project may be called unique and
exemplifies an added conception of the educa-
tional privileges of the University to the citizens
of the state, particularly its leaders and profes-
sional members. The open-minded approach
and the dependence upon actual working experi-
ence for future guidance speaks for its success.

C. A. McK.

Collection Agencies

FROM time to time it seems necessary to
warn the profession against one type of par-
asite which seems endemic and to which the pro-
fession seems especially susceptible. We refer
to a certain type of collection agency.

Doctors have various attitudes toward the
problem of collecting bad accounts. Some take
the course of the fisherman who when he hooks
a bullhead cuts the line and forgets the inci-
dent. Others have their own individualistic
methods of writing a note or letter to the de-
liquent, with varying results, while still others
utilize collection agencies.

An agent for some local or distant collection
agency approaches a doctor and verbally recites

the terms of a contract between the doctor and the agency whereby the agency subtracts a certain percentage from the amount collected for service rendered. The agent assures the doctor that no high pressure methods will be used and that collections will be remitted promptly. A number of accounts are listed and turned over to the agent, the doctor signing on the dotted line and perhaps not giving the printed terms of the contract careful scrutiny.

A few months elapse and nothing has been heard from the collection agency except that complaints as to the methods of the agency have directly or indirectly reached the doctor's ears. An inquiry directed to the agency brings the information that the agency is entitled, according to the signed contract, to its commission on the entire amount of the accounts listed before remittances to the doctor are due and that the doctor is still indebted to the agency for a certain sum. Regretting the apparent misunderstanding, the agency kindly offers to accept a number of additional accounts at no extra charge so that remittances may be forthcoming. The doctor has sold his accounts and is helpless.

A perusal of one of these contracts recently submitted to MINNESOTA MEDICINE shows it to have been ambiguously worded and only a legal expert could determine what recourse the victim has.

A doctor should refrain from employing a collection agency about which he knows nothing. Only an agency employed by some other doctor and one that has proved its reliability should be patronized. The importance of carefully studying a contract before it is signed and not taking the agent's glib assurances cannot be too strongly emphasized.

American Medical Editors and Authors Association

A DOCTOR is frequently invited to join organizations of one type or another and is at a loss to decide whether to join or not. Some are natural joiners and will join everything that comes along, from a new medical association to a golf club a thousand miles distant.

Renewed activity on the part of the American Medical Editors and Authors Association for the purpose of adding new members has doubtless

raised the question in the minds of many as to the advisability of joining. Each individual must, of course, decide for himself, but it is always advisable to inquire whether the returns from membership in any organization justify the amount spent for dues.

Many years ago an association of medical editors was formed but died a natural death after a brief existence. Presumably there was little need for such an association. The editors of state medical journals meet each year in Chicago with the secretaries of the state associations for the discussion of common problems and interests. When, a few years ago, the proposal to form an association of editors of state journals was made, the proposition was turned down as an additional useless organization.

A number of years ago, the American Medical Editors and Authors Association was formed. Its membership was not particularly exclusive, as doctors who had merely published a single case report were invited to join. The attempt of the organization to speak for the profession on economic and legislative problems, thus usurping the prerogatives of our national organization, met with disapproval.*

Recently, the organization has become more active under a new director. Its declared purpose is to bring medical authors into closer relationship with publishers; to assist in preparing medical papers; to uncover medical literary genius. Through its agency, the services of the library of the New York Academy of Medicine will be made available to doctors without charge beyond the usual fee charged by the library. Submitted articles will be put into proper shape for publication and submitted to journals in the neighborhood.

Does a medical author need the services of such an organization? We doubt it. The libraries of the American Medical Association, Surgeon General's office, and New York Academy of Medicine are available to any doctor without the necessity of an intermediary. Although writing is difficult for the majority of doctors, any member of the profession who has an idea or experience worth reporting does not have much difficulty in getting into print. The opposite is most likely true—that much that

*Medical Organizations Old and New. *Jour. Am. Med. Assn.*, 97:932, (Sept. 26) 1931.

appears in print is mere repetition. Most editors are only too willing to assist medical authors in preparing manuscripts for publication, but after all, if a doctor affixes his name to a paper it should represent his effort and not that of someone else. If all one is likely to get by joining an authors' organization is a membership certificate, we would strongly recommend the spending of a less amount in the purchase of an inexpensive manual† on the writing of medical papers, an investment which would bring a very decided return to any author.

OF GENERAL INTEREST

Dr. I. L. Mitby, formerly with the Faribault Clinic, is now associated with the Rude Clinic at Hibbing, Minnesota.

* * *

Dr. and Mrs. E. P. Lyon were honor guests at a dinner given by members of the faculty of the school of nursing of the University of Minnesota, Thursday, November 19, at the Curtis Hotel, Minneapolis.

* * *

The national award for the best program presented in the United States on national hospital day last May was made to the Wesley Hospital of Wadena, Minnesota. Presentation was made recently by Dr. A. F. Branton, president of the Minnesota Hospital Association, to Miss Madell Motsiff, superintendent of Wesley Hospital.

* * *

Dr. W. C. Jump, a graduate of the Medical School of the University of Minnesota in 1932, has opened offices for practice at Madison Lake, Minnesota. He practiced in Houghton, Michigan, following his graduation and from there went to Pontiac, Michigan, where he was located before coming to Madison Lake.

* * *

Sympathy is extended to Dr. Horatio B. Sweetser, Sr., of Minneapolis, and his two sons, Dr. Theodore H. Sweetser and Dr. H. B. Sweetser, Jr., in their recent bereavement. Mrs. H. B. Sweetser, Sr., passed away on November 17. She had long been interested in welfare work in Minneapolis and was at one time president of the Women's Auxiliary of the Minnesota State Medical Association. Besides her husband and two sons, she leaves two daughters, Mrs. F. S. Preston of Minneapolis and Mrs. A. J. Albrecht of Belle Plaine.

†Simmons, George H., and Fishbein, Morris: *The Art and Practice of Medical Writing*. Chicago: A. M. A., 1925.
Mellish-Wilson, Maud H.: *The Writing of Medical Papers*. Philadelphia: W. B. Saunders, 1929.

Christmas Seals—Each year the public is asked to buy Christmas seals to be affixed to outgoing mail and each year since the annual sale of seals began thirty years ago there has been a generous response. Proceeds derived from the sale of the seals in our State are used for the support of the Minnesota Public Health Association and all but 5 per cent of the fund raised is spent in the activities of the Association in the state, for the most part in combating tuberculosis. Five per cent of the amount collected is sent to the National Tuberculosis Association. Although there has been a gratifying fall in the incidence and death rate from tuberculosis in recent years, some 70,000 individuals, half of whom are from fifteen to forty-five years of age, still die in a year from tuberculosis. The need for continuation of the seal sale is still evident.

* * *

Surgery is the name of a new journal to be published beginning in January, 1937, as a monthly publication devoted to the art and science of surgery. The journal will be published by the C. V. Mosby Company of St. Louis under the editorship of Dr. Alton Ochsner of New Orleans and Dr. Owen H. Wangensteen of Minneapolis. Associate Editors are Dr. Alfred Blalock of Nashville and Dr. William F. Rienhoff of Baltimore. Minnesota surgeons and physicians serving on the Council, Editorial Board and Committee on Publications are: *Advisory Council*—Dr. Donald C. Balfour, Rochester; *Editorial Board*—Dr. Ralph K. Ghormley, Rochester; *Committee on Publications*—Dr. E. T. Bell, Dr. Charles D. Creevy and Dr. Leo G. Rigler, Minneapolis; Dr. Albert C. Broders, Dr. Louis A. Buie, Dr. Harold I. Lillie, Dr. John S. Lundy, Dr. Frank C. Mann and Dr. Charles W. Mayo, Rochester. The purpose of this new publication will be the prompt publication of new and worthwhile surgical papers. It will also review all important surgical meetings held in all parts of the world. No abstracts will be published nor will *Surgery* be the official publication of any surgical organization.

* * *

At the close of the last academic year, Dr. E. P. Lyon, Dean of the Medical School, retired from active service at the University of Minnesota. During his administration, covering a period of twenty-three years, the Medical School exhibited steady and continued growth. As a fitting tribute to his stimulating leadership, the alumni and faculty of the Medical School proposed to establish in his honor the Elias Potter Lyon Medical Lectureship in Medicine at the University, the fund for this purpose to be raised through subscriptions by alumni, faculty, students, and friends. The response to this proposal has been enthusiastic and generous. Anyone who welcomes the opportunity of contributing to the Lyon Lectureship fund before the project is closed may send his donation to the Office of the Comptroller of the University of Minnesota.

In Memoriam

Frederick Alexander Erb
1873-1936

ON the beautiful Sunday morning of October 25, 1936, as the church bells were calling many to early worship, death took one of the most valued members of the medical profession of Minneapolis.

Dr. Frederick A. Erb was born in Minneapolis, July 5, 1873, the son of Mr. and Mrs. Alexander Erb, who came to America from Baden, Germany, in 1858.

He received his entire education in Minneapolis. He was a member of the first class graduated from East High School. He spent two years in academic work at the University of Minnesota in preparation for the Medical School from which he was graduated in 1902. He was a member of the Sigma Chi and Nu Sigma Nu fraternities.

In 1905, he married Miss Jessie M. Cribb of Milwaukee, who with one daughter, Mrs. Donald Grandin of Minneapolis, and three sons, George, of San Francisco, Frederick and John of Minneapolis, survive him.

Dr. Erb practiced medicine in Minneapolis for thirty-four years. He was one of that group of modest men who, though fully qualified to go into the practice of special branches of medicine, remained simply a "family doctor."

During all the years of his professional career, he was an active member of the Hennepin County Medical Society. He was president of the Society in 1926, chairman of the Executive Committee in 1927, vice chairman of the Local Committee on Arrangements for the American Medical Association meeting in Minneapolis in 1928, and chairman of the Building Committee in 1929. At the time of his death he was a member of the Society's Board of Trustees and Board of Censors.

He was also active for many years in the tuberculosis work of Minneapolis and Hennepin County. He served as president of the Hennepin County Tuberculosis Association from 1933 until his death. Previous to that he had served for a number of years on the Association's Executive Committee and for a longer period, as a member of its Board of Directors.

Dr. Erb was always interested in those services of the Tuberculosis Association which give to Minneapolis and Hennepin County physicians in private practice, aid in their diagnosis and treatment of tuberculosis. During his administration, and largely because of this interest, the Tuberculin Service for Physicians was established. The Bulletin which accompanies the deliveries of the tuberculin was also one of the ideas which he fostered and in which he took a keen interest.

The John W. Bell Tuberculosis Lectureship in the Hennepin County Medical Society and the Richard Olding Beard Tuberculosis Lectureship in the Third District Nurses Association were established during his tenure of office.

The health educational work during his administration, especially in the schools, made marked advances.

The most recent development and one which he had long advocated, is the new x-ray service for private patients who are unable to pay for their x-rays.

In no period in the history of the Hennepin County Tuberculosis Association has more substantial progress in the fight to control tuberculosis been made than during the years Dr. Erb served as the Association's president. He was loved and esteemed by all with whom he worked—the Board of Directors, the Executive Committee, and the Staff. All felt an irreparable loss in his sudden and untimely death. The high regard in which Dr. Erb was held by the Hennepin County Tuberculosis Association is, perhaps, best expressed in the resolution passed by the Association:

"The Hennepin County Tuberculosis Association has lost a staunch and vigorous leader in Dr. Frederick A. Erb, who for many years has given unstintingly of his time, energy and outstanding capabilities, in its service. He brought to our Association not only his deep personal interest but the good will and support of his wide circle of personal and professional friends.

"During the years of his presidency, 1933, 1934, 1935 and 1936, the members of the Hennepin County Tuberculosis Association have worked unitedly not only to carry forward the public services which were already established, but also to initiate new health projects that he was instrumental in developing, which have since won the Association nation-wide recognition.

"We, who have served on his Executive Committee, have on many occasions appreciated his sound judgment, his unequivocal stand for and his vigorous support of whatever he considered would best serve the public good. We pledge, as a tribute to his splendid leadership, and to those qualities which he exemplified, to carry forward the work in which he was so vitally interested, as he would want it done."

He ignored signs of impending danger to his own health. He chose to continue his daily work rather than surrender and live a life of inactivity, contemplating the inevitable. He died as he wished, suddenly, without premonition, and in the midst of an active, useful life.

Dr. Erb was honored by his colleagues, loved by his patients, and respected and appreciated by the community in which he spent his entire life. He was modest, conscientious, thoughtful, honest, sympathetic and earnest. He was a wise counsellor, a good companion and a loyal friend.

R. Roy Kennedy
1883-1936

DR. R. Roy Kennedy, Minneapolis, died suddenly at office in the Physicians & Surgeons Building, Saturday, November 7, 1936, at the age of fifty-three.

He was born at Chippewa Falls, Wisconsin. He was graduated from North High School, Minneapolis, and Marquette University Medical School, and began practice in Minneapolis in 1911.

Dr. Kennedy specialized in obstetrics and gynecology and was a member of the Hennepin County Medical Society, the Minnesota State Medical Association and the American Medical Association. Also, he was a member of the staffs of Swedish, St. Mary's and Asbury Hospitals in Minneapolis.

Services for Dr. Kennedy were held at Lakewood Chapel on Tuesday, November 10, 1936. Dr. Charles Fox Davis of the Asbury Hospital Association officiated. The pallbearers were Dr. Charles Kistler, Dr. John Gammell, Dr. John E. Hynes, Dr. Alvin Kistler, Dr. Matthew Lynch, and Dr. Harry King.

He is survived by his wife, Mary Ellen; mother, Mrs. William T. Kennedy; brother, Dr. Claude C. Kennedy, of Minneapolis, and a sister, Mrs. Fred Sherman of Dryden, Washington.

Dr. Kennedy practiced in Minneapolis continuously for twenty-five years. He was most devoted to his family and to his patients, giving to both all of his time. He was a man who always thought of others first, being unselfish in all of his dealings. His patients and family miss him sadly.

Eugene Garfield McKeown

1881-1936

EUGENE GARFIELD McKEOWN was born near Elkton, South Dakota, October 10, 1881. Early in his childhood he moved with his parents to Chatfield, Minnesota, where he resided until he entered school at Carleton College, Northfield, Minn. Later he entered the University of Minnesota, where he graduated from the School of Medicine in 1909.

On August 5, 1909, he was united in marriage to Miss Mary E. Burton, at Delhi. She survives him.

Dr. E. G. McKeown started his medical practice in Edgerton, in the summer of 1909, and in 1917 he moved to Pipestone, where he has since practiced. During the World War he was commissioned Assistant Surgeon in the U. S. Navy. For the past eight years he has been Physician-in-Charge at the Pipestone Indian School.

He was a member of Blue Lodge A. F. & A. M., No. 148, Pipestone, Triune Chapter No. 51, Pipestone Commandery No. 38, Calumet Chapter No. 51, O. E. S., Osman Temple of the Shrine, Scottish Rite Bodies, St. Paul Council No. 1. He was Grand Master A. F. & A. M. of Minnesota, 1935, a member of the I. O. O. F., Pipestone, American Legion, Pipestone Civic and Commerce Association, Kiwanis Club, Southwestern Minnesota Medical Society, Minnesota State Medical Association, the Association of American Railway Surgeons, and the Association of Great Northern Railway Surgeons. On November 1, 1935, he was elected a fellow in the American College of Surgeons. He was also first vice president of the Minnesota State Medical Association at the time of his death.

Dr. McKeown was an ardent worker in the various branches of the Masonic lodge, and it was while making a trip to a Commandery meeting at Mankato that death came to him. The news came with the stunning suddenness of a thunderbolt. Hale, hearty, in the prime of his life and career, it seemed unbelievable that his enthusiasm, service, good fellowship had ended, that he would never again mingle with those who were glad to call him friend.

He is survived by his son, Roy, and daughter, Marian, of Pipestone; his parents, Mr. and Mrs. John McKeown, of Chatfield; and six sisters: Mrs. B. G.

Muxlow, of Byron; Eva McKeown, of Wabasha; Mrs. Roy P. Smith, of Flandreau; Dorothy McKeown, St. Paul; Mrs. W. J. Ramthun, Byron, Minnesota; and Martha McKeown, of Evanston, Illinois.

Joseph Graham Mayo

1902-1936

THE younger son of Dr. and Mrs. Charles H. Mayo, of Rochester, Dr. Joseph Graham Mayo, was the grandson of Dr. William Worrall Mayo, the nephew of Dr. William J. Mayo and, on the maternal side, the nephew of Dr. Christopher Graham. One with such antecedents would be expected to enter the medical profession and the scant decade of Dr. Joseph's professional life was devoted, for the most part, to internal medicine.

Dr. Mayo was born in Rochester, August 31, 1902. He attended schools in Rochester and the Gilman Country School of Baltimore. His collegiate work, begun at Princeton University in 1920, was completed at the State University of Iowa, where he received the degree of Bachelor of Science in 1926 and of Doctor of Medicine in 1927. For a year in 1927 and 1928 he served internship in the Scott and White Hospital of Temple, Texas. He entered The Mayo Foundation as a Fellow in Surgery in 1928 but transferred to medicine in 1930. His postgraduate training of more than four years included also pathology and neurology. In 1934 he was appointed associate in medicine, The Mayo Clinic, and he became consultant in the section on medicine headed by Dr. Lee W. Pollock. In 1936 he received the degree of Master of Science in Medicine from the University of Minnesota. At the time of his death Dr. Mayo was entering on his period of full productivity in medicine. He had written on neurologic, vascular and gastro-intestinal subjects and his patients were devoted to him.

In fact, "Dr. Joe" was liked by everyone, his friendships were numerous and widespread and he was a great out-of-doors man. Fishing, golf, riding and hunting were his avocations and it was while he was returning from a hunting trip that he lost his life. On November 9 he was driving with his dog on a road near Cochrane, Wisconsin, when at a grade crossing the North Coast Limited of the Burlington railroad struck and demolished his automobile.

In 1927, Dr. Mayo married Miss Ruth Rakowsky of Joplin, Missouri. She and two sons, David Graham and William James, respectively six and three years of age, are living. Others who survive Dr. Joseph, besides his parents, are his brother and sisters: Dorothy, Louise (Mrs. George Trenholm), Marilyn, and Dr. Charles William, all of Rochester; Edith (Mrs. Fred W. Rankin) of Lexington, Kentucky, and Esther (Mrs. John Hartzell) of Detroit, Michigan.

Dr. Mayo was a member of the American Medical Association, the Minnesota State Medical Association, the Southern Minnesota Medical Association, the Olmsted-Houston-Fillmore-Dodge County Medical Society, Nu Sigma Nu and Sigma Chi. He was also a Mason.

Testimonial Dinner to Retiring Members of University Medical School

June 10, 1936

A SIGNIFICANT and memorable occasion in the history of the University of Minnesota occurred on the evening of June 10, 1936, when a testimonial dinner was given in the Minnesota Union in honor of nine distinguished members of the Medical School faculty who were to retire on June 30 because of age. This group of men has played such an important role in the development of this Medical School that their retirement from active service becomes of major historical significance. For this reason the remarks of the evening, informal though most of them were, have been collected and are being published so that they will become a part of the permanent record of medicine and medical education in Minnesota.

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Dr. L. D. Coffman, President of the University of Minnesota, Presiding

While everyone knows that we have met this evening to pay our respects to the nine members of the medical staff who are retiring from active service this year, and while I should be happy to refer more particularly to the character and quality of the service of each of these men, it is not expected that I shall do so. My responsibility at the present time consists of presenting the toastmaster of the evening. I am not quite clear why I should be called upon to perform this pleasant task for the toastmaster is well-known to every person in the audience and he has been an associate and personal friend of the men who are retiring from active service. Nevertheless, there is a feeling that the exercises of the evening will not be properly launched unless the toastmaster is formally presented by the president of the University. I am, therefore, happy to present Dr. Litzenberg, who will now take charge of the meeting.

Following President Coffman's introductory remarks, Dr. Litzenberg introduced the representatives of the departments to which the retiring members of the faculty belonged. These in turn presented the honored guests.

•
Dr. Clarence M. Jackson, Professor of Anatomy, Presenting Dr. Charles A. Erdmann, Associate Professor of Anatomy

It is my privilege and pleasure to present my colleague, Dr. Charles A. Erdmann. In 1893, just forty-three years ago, he completed the medical course at Minnesota, and was immediately appointed as a member of the anatomical teaching staff of the Medical School. His period of teaching service is even longer, however, for during the three preceding years as medical student he served also as demonstrator in Anatomy. So that Dr. Erdmann has to his credit forty-six years of continuous teaching, which is probably a unique record of faithful and efficient service in this faculty. During this long period he has wit-

nessed and participated in the evolution of the Medical School, almost from its very beginning.

And now he comes to the age of retirement for a well-earned vacation. We extend to him our heartiest greetings and best wishes for a long period of future leisure and enjoyment. According to the poet Goldsmith:

How blest is he who crowns in shades like these
A youth of labor with an age of ease.

But perhaps a more appropriate sentiment in the case of Dr. Erdmann is the saying of Oliver Wendell Holmes, that it is better to be seventy years young than forty years old.

Dr. Erdmann, we salute you!

•
Dr. Owen H. Wangenstein, Professor of Surgery, Presenting Dr. Franklin R. Wright, Associate Professor of Surgery and Director of the Division of Urology

In my day there has never been a more colorful personality attached to the Department of Surgery than that of Dr. Franklin Randolph Wright. He has been a true pedagogue, interested in every detail related to teaching. The affectionate regard in which he is held by his former students attests well the merit of his own pedagogy. How a mind with the broad interests of Dr. Wright could concentrate itself largely upon a restricted surgical field has often intrigued me. As a junior hospital officer, together with other interns and Fellows, I have trailed Dr. Wright about, eager to hear his comment upon whatever he chose to discourse upon and catch the pearls of wisdom as they fell from him. I believe it is to be admitted that Dr. Wright has now and then meandered away from the professed field of his interest, viz., urology, to the broader fields of medicine, education, and life itself, to the delight and betterment of those of us who were privileged to be associated with him. In later years, it has been my pleasure and good fortune to stroll with him arm in arm through the wards and it is a pleasant duty to say here how much I have enjoyed and profited by these occasions. Dr. Wright graduated from this Medical School in 1894, and previously from our Dental School; he became attached to the faculty of the Medical School as Clinical Assistant in 1896. In 1902 he was made Clinical Instructor in Dermatology and Genito-urinary Diseases, which position he held until 1909, at which time he was made Assistant Professor in Genito-urinary Diseases, holding this rank until 1915. At that time he was made Associate Professor of Surgery in charge of the Division of Urology. In 1920, he was made Associate Professor of Urologic Surgery and named Director of the Division of Urology. Dr. Wright was amongst those honored for long service at the special convocation in 1933.

During many years of teaching, which I am certain

TESTIMONIAL DINNER

Dr. Wright has thoroughly enjoyed, he has brought to the members of the surgical department the stimulating example of giving to his instruction the best of which he was capable. Dr. Wright has left his mark upon the department which I trust will remain with us for many years to come.

●
Dr. Frederick C. Rodda, Clinical Professor of Pediatrics, Presenting Dr. James T. Christison, Associate Professor of Pediatrics

Dr. J. T. Christison's connection with the University dates back to the early nineties, so that his service is of long standing.

My first contact with Dr. Christison was in 1912 under the regime of Dr. J. P. Sedgwick. Whereas we now have some forty men doing pediatric work in the Twin Cities and there is a large staff to draw from, in those early days there were only about a half dozen men doing pediatric work. Great demands were made upon their time and the duties of the clinic and teaching were arduous.

However, it is to be noted that Dr. Christison was always most generous in his efforts, willing to fill in during the illness of any of the members and always having time to help and encourage the younger men. This spirit of helpfulness has been a strong characteristic of Dr. Christison's connection with the University.

I think Dr. Christison, on his retirement, will miss the younger men just as much as they will miss him. He will miss some of those brilliantly bizarre answers, which were to be found in the examination papers. He will also miss that annual thriller and speller which Dr. Coffman sends out. This was a letter from the Board of Regents, which came annually, stating that they confirmed his position as Professor of Pediatrics, for the year, with salary, one goose egg.

I trust fate will decree that this added leisure will add much to the happiness of Dr. Christison for many years to come.

●
Dr. S. Marx White, Professor of Medicine, Presenting Dr. James S. Gilfillan, Associate Professor of Medicine

Dr. James S. Gilfillan was given the degree of M.D. from the University of Minnesota in 1897. He has served as a teacher of clinical medicine in Ancker Hospital, St. Paul. He held appointments as Assistant in Clinical Medicine from 1903 to 1908, Clinical Instructor from 1908 to 1910, Clinical Professor from 1910 to 1913, Assistant Professor of Medicine from 1913 to 1915, and Associate Professor of Medicine from 1915 to 1936, all without salary. He has had a marked influence on students and on the medical life of this northwest because of certain characteristics which I shall attempt to appraise.

His contacts with students and colleagues have been truly enriching because of his profound knowledge of the field to which he has devoted his attention—that of Internal Medicine. A wide reader, with an

unusually retentive memory, he is conversant with the literature and able to draw freely from these sources.

With a clean-cut scientific bent of mind, his ability to sift the wheat from the chaff in diagnosis and treatment gives him a directness with simplicity of approach that sets a standard for other older as well as younger men to strive to attain.

The breadth of his interest and his keenness in observation, with an unusually wide experience in the wards of Ancker Hospital as well as in private practice, has given him intensive knowledge of the borderlands of medicine as it touches related fields of practice. The surgeon and the specialist in more restricted fields learn much because of his acumen.

A characteristic widely known and acclaimed is his uncompromising honesty, both in opinion and in expression. He has never been known to allow any consideration of circumstance or of personal profit to cause him to waver in this regard.

In this connection I should like to recall to memory another of the great and noble members of the St. Paul contingent of teachers in the Medical School, the surgeon, Dr. Alex MacLaren. Both of these men, Dr. Gilfillan and Dr. MacLaren, have been endowed with the ability to draw needed lessons from the limitations of our art and failures in our practice.

Last, but not least, Dr. Gilfillan's teaching and conversation have been salted and peppered, but withal delicately flavored by a sense of humor that makes his leadership delightful and never to be forgotten. I have heard him more widely and often quoted than any of the other stars in our facultative galaxy.

Dr. James S. Gilfillan, wise and subtle teacher and practitioner—gentleman, the savor of your comradeship shall always linger with both your students and your colleagues.

●
Dr. J. C. Litzenberg, Professor of Obstetrics and Gynecology, Presenting Dr. John L. Rothrock, Professor of Obstetrics and Gynecology

I present to you Dr. John L. Rothrock, Professor of Obstetrics and Gynecology.

Were it not for his own modesty, Dr. Rothrock would tonight be retiring as Chief of the Department, instead of as full Professor.

When the Department of Obstetrics and Gynecology was organized, at the beginning of the second decade of the century, Dr. Rothrock was asked by the administration of the Medical School to head the division of Gynecology in the new department. This he declined to do and again, in 1913, at the reorganization of the Medical School, and after the death of the revered Chief of the Department, Dr. Parks Ritchie, Dr. Rothrock was asked to head the department. Again he declined. This was to all of us in the department a source of great regret because we not only admired his great skill and teaching ability, but we all recognized him as the most learned man in our specialty, in this part of the country.

When the present incumbent was then offered the

Chiefship, he went to Dr. Rothrock and urged him to reconsider, but he modestly but persistently adhered to his decision. However, with characteristic loyalty he said he would be glad to do anything he could for the department and the Medical School. He was taken at his word and was called upon for much service throughout the long years he has been with us. To say that he performed such service with skill and judgment is to put it very mildly.

Dr. Rothrock not only worked and taught in the Ancker Hospital in St. Paul, but for many years was an active member of the University Hospital staff, where he was an inspiration to students and staff alike.

So I present to you Dr. John L. Rothrock, retiring Professor of Obstetrics and Gynecology. We shall miss him personally, for he has been a great friend. Professionally, we shall miss his wise counsel and sound judgment.

As he retires we bid him Godspeed and gratefully pay tribute to his exceptional skill as an obstetrician and gynecologist, to his great ability as a teacher, and to his constant loyalty to the department and to the Medical School.

●

Dr. Owen H. Wangenstein, Professor of Surgery, Presenting Dr. John T. Rogers, Associate Professor of Surgery

Dr. John T. Rogers is celebrating this evening a happier event than retirement from active teaching, viz., a wedding in his home.

How surgeons spend their time following retirement has been a matter of great interest to me. You see, I am already looking forward to that day myself. In this country there appears to be no uniform plan. In England, in the main, as far as I have learned, when a man retires from his hospital appointments, he leaves his work altogether. I was told by Mr. Wilkie, now Sir David of Edinburgh, that his predecessor and preceptor, Sir Harold Stiles, had not made his appearance in the hospital since he left a number of years ago, and has busied himself largely with golf. In Germany, on the contrary, men frequently pursue their practices independently or apply themselves to writing.

Man, it has been said, was ordered to earn his bread in the sweat of his brow as a punishment for his disobedience. In the plenitude of divine benevolence man was permitted to repair his fatigue and exhaustion by earth's greatest solace—the blessing of rest and repose—by calm and peaceful sleep which should be the immediate reward of his labor. Undoubtedly in the lives of many medical men, this pleasure is not shared in its full measure until retirement.

An occasion such as this teaches us how much more enduring our missions are than we, and what pleasure and genuine satisfaction there is in the devotion of our lives and interests to lofty purposes. One occasionally hears it said that the only purpose of Life is to live the life that is ours. How much more full is

a life motivated by high ideals and dedicated to a worthy end than one occupied by idle pursuits.

Dr. Rogers, who was a graduate of this Medical School of 1891, first became connected with the faculty of the Medical School in 1895, when he was made Clinical Instructor in Pediatrics, which rank he held until 1897, when he was transferred to the Department of Surgery with the same rank. In 1901, he was made Professor of Clinical Surgery, and held this rank until 1913, when, at the time of the reorganization of the School he was made Assistant Professor of Surgery. He was made Associate Professor of Surgery in 1916 and has held that rank up to the present time. Dr. Rogers also was among those honored for long service at the special convocation given by the University in 1933.

At this time it is a pleasure to acknowledge his long period of useful service to the Department of Surgery and to wish him Godspeed.

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Dr. S. Marx White, Professor of Medicine, Presenting Dr. Thomas B. Hartzell, Professorial Lecturer in Medicine

Dr. Thomas B. Hartzell earned the degree of D.D.S. from the University of Minnesota in 1893, and that of M.D. in 1894.

His teaching career began as an undergraduate instructor in histology in 1890. He served as demonstrator in Oral Surgery from 1894 to 1896. From 1896 to 1903 the president's records reveal the reverberating, or perhaps better said reconsonating, title of Professor of Comparative Dental Anatomy and Physical Diagnosis and Oral Surgery. I would call that a mouthful. From 1903 to 1913 Dr. Hartzell calmed down to a professorship in dentistry and in the latter year was made Research Professor in Mouth Infections, and in 1920 Lecturer in the Department of Medicine.

President of the National Dental Association in 1921-1922; member of the Committee on legislation and enrollment of the dental committee, General Medical Board of the Council of National Defense in 1917; member of the medical section of the National Research Council and director of research in Minnesota from the American Dental Association since 1914; as well as research consultant in the Dental Department of the U. S. Bureau of Public Health, Washington, D.C.; his following has been national in scope.

John Hunter in London in 1771 published one of the three most important treatises in the history of dentistry. His work had been preceded by Pierre Fouchard's *Le Chirurgien Dentiste* in 1728 and by Philip Plaff's *Abhandlung von den Zähnen* in 1756. Benjamin Rush in Philadelphia in the later years of that century had a glimpse also of the relationship between dental disorders and more generalized infections, but a century of the development of mechanical perfection in restoration and replacement of the teeth did much to obscure and hide the dental side of these relationships.

It was in this country from 1909 to 1916 that Frank Billings with E. C. Rosenow and others developed our

knowledge of focal infection from bacteria of the streptococcus-pneumococcus group by way of teeth, tonsils and other portals.

Dr. Hartzell's training in both dentistry and medicine by great good fortune has given him an insight into, and an urge toward, the development of our knowledge of these relationships between dentistry and medicine. For many years I had the privilege of association in the University Hospital with this virile worker and wish to express for medicine the appreciation we all feel for his signal service in further development of that great field in which medicine and dentistry join hands. His work, together with that of other far-seeing investigators, has done much to alter the practice of dentistry all over the world and to bring dentistry and medicine together as related branches of the healing art.

Dr. Thomas B. Hartzell, may I take this occasion to remind you that time and tide wait for no man? Like the proverbial calf when the train speeds by the field in which he is feeding, you may still prefer to scud hightailing across the academic pastures, yet you and I and most of us here must give way to younger men who, it is to be hoped, will not follow too closely in our footsteps.

At that, you are still privileged to have youthfulness of spirit and the forward look.

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Dr. Owen H. Wangenstein, Professor of Surgery, Presenting Dr. Charles H. Mayo, Professor of Surgery

This is indeed a unique occasion in the annals of our School. Should we continue to lose our men at this rate every year, the surgical faculty would soon be decimated.

It is said that one of the functions of the old is to counsel the young. I am wondering, Mr. Toastmaster, whether some mistake has not been made in the real ages of our distinguished colleagues and servants of the University. You will note that not one has exercised this prerogative of primogeniture.

The University long ago realized that in the person of Dr. Charles H. Mayo of Rochester there was a budding genius. The echo of his fame had returned to our very city. In 1919 he was appointed Professor of Surgery and over a period of years has given enthusiastically and freely of himself whenever called upon. Already in 1915, however, Dr. Mayo had been made Professor of Surgery in the Mayo Foundation and in the Graduate School. It is to be freely admitted that, in addition to filling a useful niche as a teacher, his name graced the rolls of the surgical staff as a brilliant ornament, for our distinguished colleague, whom we honor tonight, has become a world citizen. Whether he expressed himself through the medium of the written word in surgical literature or from the lecture platform or the railroad platform, we knew we would have from him some pithy and cogent remarks. One of the very beautiful and exemplary things relating to the brothers Mayo has been the devotion and attachment of one to the other.

It has been more than a fraternal interest, yes, something akin, in each instance, of that of a father's solicitude for his son, a spirit we would all do well to emulate.

To recount here all of the varied activities of Dr. Mayo would be an intensely interesting story. To recite his impressive list of citations, decorations and honorary degrees would confound you. We are all proud that he has been one of the few recipients of an honorary degree from this institution. Together with his brother, Dr. William J. Mayo, he has established the Mayo Foundation for graduate education and research—a lasting monument to the munificence of two philanthropic and public spirited men. The remarkable clinic which they have established at Rochester has no counterpart the world over, and has been the never ceasing wonder of medical men. It is fitting that now when Doctor Mayo becomes Professor of Surgery Emeritus, that we pay tribute to his unusual attainments in diverse fields. His versatility has been as astounding as his accomplishments. "Doctor Charlie," distinguished surgeon, educator, leader in the field of public and community health, citizen of the world, and true gentleman, the University acknowledges with pride and gratitude your years of association with the surgical department. May we continue to have the benefit of your vision and friendly counsel during many years filled with happiness for you!

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Dr. Lotus D. Coffman, President of the University, Presenting Dean Elias P. Lyon, Dean of the Medical School

Now that Dean Lyon is retiring from the active deanship of the Medical School, perhaps I may be permitted to make some remarks about his deanship. What I shall say reveals a side of his character which the members of the medical staff and many of his friends never suspected he possessed. He was so unlike the other deans of the University that it was always a comfort and a pleasure to confer with him, and particularly about budgetary matters and the needs of the Medical School. Instead of asking for large increases in the Medical School budget, he would come in at the close of every year when budgetary matters were under consideration and with face fairly aglow with the spirit of coöperation say, "I have been examining the budget of the Medical School and I found \$50,000 that we won't need this next year, if you can use it to advantage somewhere else in the University." Then he would continue, "I have just had a meeting of the Administrative Committee of the Medical School (a committee, you will recall, which is composed of the heads of the departments of the Medical School) and these gentlemen in a spirit of great magnanimity have declared that they would prefer to have fewer assistants and scholars and fellows next year; and furthermore that they have discovered that the members of the staff of the Medical School love to work simply for the sake of the work, and that not one of them wishes to have his salary increased or to be promoted in rank." You will never

know what a source of great gratification and pleasure it was to have a dean talk about budgetary matters, promotions and the like, in such a highly professional way. I always felt that the president of the University should not permit a dean to be more magnanimous than he; so that I always replied to Dean Lyon with a grand gesture by saying, "I am sure that the rest of the University would not ask the Medical School to reduce its budget by \$50,000, and I personally should like to see every member of the medical staff promoted and his salary advanced."

The staff never really knew how completely and fully the Dean of the Medical School represented its idealism in his conversations with the President of the University. On the other hand, I can assure you that after the pleasantries of the occasion had been disposed of, none of you will know how tenacious he was in his demands and how insistent he was in declaring that the Medical School is the best school in the University of Minnesota, the best in the Northwest, the best in the United States, and that the members of its staff are the most distinguished and illustrious medical scholars of the world. His eloquence was so persuasive that if the University had suddenly fallen heir to a half million dollars, I should have been disposed to lay it in his lap for the benefit of the Medical School.

In all fairness it must be said that, during his administration of the Medical School, Dean Lyon was never actuated by mean or selfish motives. He was kindly and generous in dealing with others, professional and high-minded in discussing the problems of the Medical School, and friendly to students and staff. In his administrative capacity he kept his face to the future rather than to the past. A scientist in his own right, he knew how to evaluate the scientific efforts of others. Ladies and gentlemen: I am happy to present our friend and neighbor, our associate and colleague, a university dean who administered the affairs of his college with no thought of gain to himself and in a spirit of selflessness which others would do well to emulate, and whose contribution to this University is as enduring as the benefits of medical science are to humanity, Dean Lyon!

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**Dr. Harold S. Diehl, Dean of the
Medical Sciences, Presenting
Portrait of Dean Elias P. Lyon**

History, whether it be of nations or of institutions, runs along as a continuous, sequential story. Here and there, however, one finds events which, like milestones, tend to divide it into eras or epochs. Such a milestone in the history of the Medical School of the University of Minnesota we are meeting this year in the retirement of Dean Lyon, who has served as its leader faithfully and well over a period covering half of its history.

The year after next we will celebrate the fiftieth anniversary of the founding of our Medical School. Within this brief space of time, even within the memory of many who are present here this evening,

this school has developed from a modest beginning to a place of distinction among the leading medical schools of this country. This development has been no mere chance. On the contrary, it has been the result of the vision and sound leadership of the administrative officers of the University and the School, the loyal and interested support of Regents, alumni and friends; and the conscientious and distinguished service of its faculty.

In this connection possibly a brief résumé of the history of the Medical School would not be amiss.* In the pioneer days medical education everywhere was largely on a preceptorship basis. When this type of instruction began in Minnesota it is impossible to say. Probably the earliest of the successful practitioners accepted as assistants young men who aspired to the practice of medicine. I had no acquaintance with this period of medical education but it doubtless served its purpose. Acting as groom, coachman, office boy, janitor and general assistant to a busy practitioner probably had some educational value and led to the development of a considerable understanding of human nature. That type of medical education, however, was a long way from our present concept of basing the practice of medicine upon a sound understanding of the human body and of disease processes.

This preceptorship period in medical education was followed by that of the private medical school. The first of these private schools were called Preparatory Medical Schools, the St. Paul Preparatory Medical School opening its doors in 1871 and the Winona Preparatory Medical School in 1872. The stated purpose of these was "the instruction of medical students preparatory to their entering medical college and during the time of their course of study when they were not in attendance upon college lectures or instruction." It was stated also that these schools were to be "considered only as preparatory and auxiliary to the medical college and in no respect a substitute for the same." At this time no medical college existed in the Northwest so students had to go elsewhere, largely to Chicago, for the rest of their medical work.

The first Medical School proper in Minnesota was organized in St. Paul in 1878. This continued for only three years but formed the nucleus of the Minnesota Hospital College in Minneapolis. This school continued, under a slight modification of name, until ten years later, when it gave up its independence to become one of the units from which the University of Minnesota Medical School was developed.

In 1883 a second Medical School was established in Minneapolis. This was called the Minneapolis College of Physicians and Surgeons. This school functioned independently for twelve years, then affiliated with Hamline University to become the Medical Department of that institution. This affiliation continued

*Historical data based largely upon various papers by Dr. Richard Olding Beard.

TESTIMONIAL DINNER

until 1908, when this school also merged with the Medical School of the University.

Both of these medical colleges were situated in Minneapolis. This was too much for St. Paul, so in 1885 a group of St. Paul physicians and surgeons who had been moving spirits in the first St. Paul school organized the St. Paul Medical College. Three years later this group joined with the Minneapolis Hospital College in turning over charters and equipment to the Regents of the University in order that there might be here one strong unified medical school under university direction.

In the archives of Minnesota a legislative act established a College of Medicine at the University in 1882. In reality, however, the University functioned at this time only as an examining body in medicine. That in itself was a forward step in raising the standards of medical education; but the Medical School as we know it today was actually founded in 1888 by the merger of the Minneapolis Hospital College and the St. Paul Medical College. Shortly thereafter the Minneapolis College of Homeopathic Medicine and Surgery gave up its charter in the same manner, and approximately twenty years later the Hamline School joined forces with the rapidly developing medical school of the University. This in brief is the story of the laying of the sound foundation upon which medical education in Minnesota now stands.

The first dean of this new Medical School was Dr. Perry Millard, a vigorous, forward-looking leader. He was in office from 1888 to 1897. These were difficult pioneer days but each year marked definite progress toward a better school.

The second administrative officer was Dr. Parks Ritchie, Professor of Obstetrics and Dean from 1897 to 1906. He engendered loyalty, was loved by all, and led the school to higher planes of educational achievement. During his administration the entrance requirements were raised and the combined six year course leading to the degrees of Bachelor of Science and Doctor of Medicine was inaugurated.

The third administrative officer was Dr. Frank Fairchild Westbrook, professor of pathology, bacteriology and public health, who served as dean from 1906 to 1913. During this period Hamline Medical School was merged with the University; the College of Homeopathic Medicine and Surgery underwent slow disintegration; the fundamental teaching departments were materially strengthened; new buildings known as the Institute of Public Health and Pathology, Millard Hall and the Anatomy building were constructed; the Elliot Memorial Hospital, the first unit of the University Hospital system, was built; the Bachelor of Science degree was required of all medical students before the awarding of the M.D. degree; the first University School of Nursing in the world was established here; and a reorganization of the faculty was undertaken. This latter effort resulted in so much bitterness and dissension that it was years before the school again settled down on a smooth keel. Dr. Westbrook was a distinguished scientist, as

well as a man of "broad vision, strong leadership, sterling integrity, and remarkable team-playing qualities which won for him the respect and coöperation of his fellows. The students of today owe much that they cannot measure to this man whom they did not know, for the position their school has held in the first rank of teaching institutions of medicine in America."

Following the resignation of Dean Westbrook in 1913 Dr. Elias P. Lyon was appointed the fourth Dean of the Medical School. He came into a difficult situation but has steered the school on a steady forward course for twenty-three years. During this period sound policies have been inaugurated, facilities have improved, and the staff strengthened. In the way of material development one might mention the construction of various units of the University hospital—such as the Todd, the Cancer and the Eustis Hospitals, the Out-patient Department, the Health Service, the Nurses' Hall and the Medical Sciences Building. Also of great importance in the development of facilities for clinical teaching has been the building of fine relationships with the Minneapolis General Hospital, the Ancker Hospital of St. Paul, the Gillette State Hospital and Glen Lake Sanatorium. During Dean Lyon's regime also has come the outstanding development in graduate medical education in this country—I refer of course to the affiliation of the Graduate School of the University with the Mayo Foundation. Of singular significance for undergraduate medical education was the inauguration of the policy of building the clinical departments around capable men who are making teaching and research their life work. In this as in other things Dean Lyon has builded soundly and well, with the result that the faculty of our Medical School has never been so strong as it is today.

In the field of medical education Dean Lyon occupies a position of leadership throughout the country. He has had the vision of new horizons and the courage to depart from traditional methods, yet with all has been wisely conservative.

Dean Lyon leaves his footprints in the sands of medical education and his imprint indelibly upon this medical school. This has been sufficient achievement for any man, but to the students who were privileged to know him Dean Lyon's outstanding qualities were those of kindness and personal, human interest. He has always considered the welfare of the student of first importance and has helped many a one over the rough spots in the road to a medical career.

To the members of our Medical School faculty whom we honor this evening, I am privileged to convey the affectionate good wishes of my colleagues and their deep appreciation of your splendid and loyal service to the School, of your unswerving interest and support which shall continue to be an inspiration for those of us who stay to "carry on."

On this occasion it is my privilege to present to the Board of Regents a portrait of Dean Lyon, to be hung in the halls of the institution to which he gave

the best years of his life. This portrait is presented by the heads of the departments and divisions of the Medical School, and the frame by the School of Nursing.

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Dr. William J. Mayo, Accepting Portrait of Dean Elias P. Lyon on Behalf of the Board of Regents of the University of Minnesota

We meet here this evening to do honor to a man who as head of the University of Minnesota Medical School has rendered distinguished service to the State of Minnesota. When Dr. Elias P. Lyon came to the University twenty-three years ago as Professor of Physiology and Dean of the Medical School, the teaching of medicine at Minnesota was of the clinical type with only moderate scientific background. Today, the Medical School of the University of Minnesota clinically and scientifically is one of the first ten medical schools in America.

Dr. Lyon came to Minnesota a trained physiologist, and physiology is the groundwork of modern medicine because there enter into its study man and all his attributes. In his new field of work as Dean, Dr. Lyon's scientific knowledge and his ability and experience in applying it as scholar and teacher were exceedingly valuable, giving him a fine understanding of the social problems of the public as related to health measures. After long and honorable service, Dean Lyon today becomes Dean Emeritus, leaving for his successor an organization which has few equals for the teaching of medicine.

In accepting this portrait of Dean Lyon on behalf of the President, the Regents, and the faculty of the University of Minnesota, I make grateful acknowledgment of our debt to Dean Lyon. The portrait will be given a place of honor in the gallery where are hung the likenesses of those men and women who have devoted their lives to university work, where it perpetually will encourage and stimulate science and the humanities.

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Dean Elias P. Lyon's Response

Ave, Mr. Toastmaster, President Coffman, Ladies and Gentlemen, *Ave*, and shall we add *morituri Salutemur*?

There was a time when I looked upon that phrase, the salutation of the gladiators, as the epitome of pessimism, the deepest depth of degradation of the human spirit. Later I changed my mind. I came to the conclusion that gladiators were too valuable to be killed off indiscriminately. Some of them rose to consequence. My guess is that their occupation was little more dangerous than football, and that they had a good time—got their names in the papers, so to speak! Their salutation to me has no ominous connotation.

However, the phrase seems inappropriate for us oldsters who are about to retire. Perhaps, indeed, some of us would put it oppositely: "We who are about to live, salute you." We ought to have a good

time from now on looking at the show and slyly criticizing the performers. Anyway, I prefer the sententious truth of Maeterlinck, "There are no dead."

The latter phrase should indeed be the motto for teachers. It is their tacit belief that their daily work lives on in their pupils, repeating itself in endless generations; that is their chief inspiration. "No life can be pure in its spirit and strong in its strife and not all life be purer and stronger thereby" was the somewhat florid and verbose way in which the same thought was expressed in a poem I used to read. To name it would mark me as having been a romantic and impressionable youth. I would not wish this fact to get out.

I am proud that I have been a teacher. I am sure that all of us retiring now to the dugout after the best game we knew how to play are proud to have been teachers. For me this choice of profession was made quite early—by the age of twenty certainly, perhaps two or three years earlier. It was chance that determined that most of my years should be spent in medical education, but it was deliberate choice that led me to prepare myself for teaching and engage in teaching as a career.

I think I could make a good case that teaching is the most useful and noble of all the professions. "There are no dead" implies that the influence of all men goes on, reverberating as it were, through all succeeding ages. But the professional teacher meets young and impressionable minds in conscious effort to cut into them an ineffaceable writing. The very nature of this contact must mean that he leaves more behind than the average man of equal ability in some other occupation.

I could argue that teaching is the most satisfying profession. My old chief, Jacques Loeb, used to state that the joy of life comes chiefly from the exercise of the instinct of workmanship. He deplored that for many, perhaps most humans, the instinct of workmanship has to be sacrificed for the more imperative instincts for food, clothing and shelter, and the instinct of procreation.

By the instinct of workmanship or instinct of labor he meant employment at what one likes to do. I often wondered whether for many people this means doing nothing. Perhaps it does. If so, it in no way lessens the truth of Loeb's dictum or the tragedy of its non-fulfillment. It is probably quite as unhappy an experience for some men to give up doing nothing as it is for us who love teaching to give up teaching. But surely we may claim that the satisfaction of this instinct in us is more essential and useful to the world.

At any rate I am convinced that many people fail in the realization of this most precious human possession, the instinct of work; that the world holds many a "mute, inglorious Milton"; that frustration and unhappiness are common. These cannot come to one who teaches and who loves to teach.

I could also make a good case that the teacher is most sure of his livelihood, most free from worry, has more social security, is less crushed by murderous

competition, has a more sanely spent leisure than almost any other profession. But I leave you to fill in your own thoughts on these matters, for most of you here are teachers.

As to research and teaching, I do not find them such separate and conflicting fields as many seem to think. Indeed I think the researcher who has students around him is perhaps the highest type of teacher. I have indicated on another occasion my deep felt conviction that science lost rather than gained when Loeb quit the university for the research institute. I say integrate research and teaching, but be careful that in enthusiasm for the former the latter does not fall into the background.

Some years ago you, Mr. Toastmaster, read to me a poem. I asked for a copy and have it still in your handwriting. I had it typed and from time to time have passed out copies—one only the other day to Dr. Gortner. It is entitled "Why I Teach."

Because I would be young in soul and mind
Though years must pass and age my life constrain,
And I have found no way to lag behind
The fleeting years, save by the magic chain
That binds me, youthful, to the youth I love,
I teach.

Because I would be wise, and wisdom find
From millions gone before whose torch I pass,
Still burning bright to light the paths that wind
So steep and rugged, for each lad and lass
Slow climbing to the unrevealed above,
I teach.

Because in passing on the living flame,
That ever brighter burns the ages through,
I have done service that is worth the name
Can I but say "The flame of knowledge grew
A little brighter in the hands I taught,"
I teach.

Because I know that when life's end I reach
And thence pass through the gates so wide and deep
To what I do not know, save what men TEACH
That the remembrance of me men will keep
Is what I've done; and what I have is naught,
I teach.

(LOUIS BURTON WOODWARD.)

And now I come to that other side of me which perhaps has been more in the view of those who planned this meeting. For I am a double faced man, a teacher and a dean.

My being a dean was as accidental and unplanned as my being in medical education. We who went from the University of Chicago and other schools to the newly formed St. Louis University Medical School in 1904 faced a strange situation. That old University—the oldest in the Mississippi valley—had taken over two recently united proprietary medical colleges, the Marion Sims and the Beaumont. The doctors who controlled these schools drove a hard bargain with the good Jesuit fathers by stipulating that they should retain their chairs for a period of nine years. For that time they were to constitute the faculty and no new members could be added without their consent. The result was that Eycleshymer and Shoemaker in Anatomy, Thompson in Pathology, myself and colleagues in Physiology were members of the University faculty but not of the Faculty of the Medical School in which we taught. It was only after two or three years that we were finally voted into the medical

faculty. Even then we were looked upon with some hostility and suspicion.

In 1907 the dean, a part time clinical man, suddenly resigned. The old time owners of the school constituting a large majority of the faculty claimed that they had the right to name the new dean. The University on the other hand pointed out that this prerogative had not been reserved to the faculty in the transfer. The latter view prevailed and the University authorities declared that one of us fundamental laboratory men—their own appointees—must take the job. The lot fell upon me.

You can imagine the situation. I headed a faculty over whom I had no real jurisdiction. The only bright spot was the whole time laboratory group who like myself were professional teachers. Practically all our efforts had to be put forth in strengthening the fundamental departments. From time to time as death or resignation intervened something could be done on the clinical side. As for the rest it consisted in seeking able young men for subordinate positions and in improving the student body. I came to believe that only on a firm foundation in science and full time teachers in both scientific and practical branches can a medical school be built or do the work for which it exists. I came to know student problems as very real individual human problems that deserve the best human judgment and the sympathy of a god.

I think it was this experience at St. Louis which convinced me that the best progress in human institutions as in the inorganic world is by slow evolution rather than cataclysm. The situation here in 1913 when I inherited a recently completed "reorganization" emphasized the same thought. If any central idea has characterized this administration it has been this of slow growth through evolution. Indeed I think most of our mistakes and difficulties in these twenty-three years have come from occasional bursts of impatience, occasional premature explosions of zeal for rapid realization of ideals.

I commend these thoughts to you who sometimes bewail that progress is slow, who see so much to do, so much untouched; "The petty done, the undone vast." Have patience, build confidence. Someday things will come. Look back to 1913; picture the medical school as embracing Millard Hall and the Institute of Anatomy, each partially completed (as Anatomy is still); of the Elliott Hospital of eighty beds standing remote and alone; of a budget of only \$225,730 for the School. \$79,600 for the Hospital, and keep up your courage.

The second idea characterizing these years probably bases in inherited characteristics of my own personality. I am not a bumptious person, have no over confidence in my own judgment. The result perhaps is that we have been more a coöperative group than might otherwise have been the case. I am proud that on the whole we have worked together. No one can claim any personal glory. This which you celebrate tonight is in no sense a personal show. So far as it represents a review it is of the common heritage of a group who look back on a quarter century of

united effort. For myself I feel tremendous gratitude to all of you, a group of friends united for an ideal. What has been done we have all done together. That on the whole is better than any one-man triumph, however great it might be.

I am tremendously proud of our young men. Many of them are our own product. We have not been too fearful of the bugaboo of inbreeding. Indeed, why should we when we see that every one of them has added to what we could give him the best that the world afforded in other places? Just now our new head of medicine is away gathering ideas for the new psychopathic institute — an addition, by the way, which we long talked about, worked for and which finally came. Our new dean is one of our boys.

In a talk on one occasion, I characterized the dean as upstander in a circus. The faculty stand on his shoulders and the President is at the top waving a flag. The metaphor fails to express the actual relation of faculty, dean and president, but I was always glad to state that my faculty were soft footed, and did not dig in their toes, and that my presidents were steady on their feet and not given to upsetting the pyramid. I say it again before all of you. It is a notable characteristic of Minnesota.

In other matters the metaphor is pretty good. The dean must have a fairly sturdy pair of legs; must be able to resist some pressure. But resiliency and elasticity are more important than great strength. A little battered but still breathing I am glad now after twenty-nine years of deaning to leave the circus ring and retire to the Valhalla of deans, where the 'lumni "cease from troubling and the weary are at rest."

As for the rest, I may only say that I have had a good life—we all have had a good life together. If the dean has been important, it has been as a sort of universal oiler, an eliminator of friction, a greasing expert. In fact I often call attention to the significant similarity of dean and diener. And I think the best dean I know of was Gunga Din, who you remember was the regimental water bearer.

I think the portrait is fine—almost, one might say, a spittin' likeness. I congratulate Mr. Brewer. In fact, I am thinking of leaving a small endowment to provide an occasional hair-cut. I know in one respect it will be a grand success where I have sometimes failed. It will keep its mouth shut.

However, my innermost thought, as you may infer from what I have said, is that the picture should have been a composite of all of us. Such combination would always create interest, not to say amazement, perhaps consternation. Imagine Dr. Beard's whiskers, Scammon's mustache, my wiry mane, O'Brien's polished dome!

Since this grand idea did not occur to your committee I accept with grateful thanks the more personal honor. Mind you I am not ashamed of my job, but I think it has been only a small part of the much larger

job we have done together. Minnesota's Medical School is a first class institution. It is no one man's monument. It stands for all who have worked here from Millard, first dean, to the last teaching fellow.

Stephen Leacock who recently retired at McGill has written interestingly on "I shall stay in Canada." I shall stay in Minnesota. If I can edge in on something useful to do, I shall be glad. If not, I shall cheer from the ring side when two years from now our beloved school enters upon its second half century.

The King is dead. Oh! Prince of Diehls! Long live the king.

CHRISTMAS SEAL

The Christmas Seal, which for many years has been offered to the public just preceding the holidays, has rightly come to be associated with the fight against tuberculosis. Although the death rate from the disease has been more than cut in two in the last thirty years tuberculosis continues to be the leading cause of death in young girls and is still a serious problem.

The story of the origin of the Christmas Seal is briefly told in a circular distributed this year by the Mississippi State Board of Health.

It seems that a postal clerk in Copenhagen by the name of Einar Holboell had the ambition to build a hospital for tuberculous children and conceived the idea of an additional and colorful stamp to be affixed to the back of each letter to sell for a penny. Receiving royal approval, funds were first collected by this means in 1904.

In 1907, Miss Emily Bissell of Delaware adopted the seal idea and was the first in this country to raise funds by this means for combating tuberculosis. The Tuberculosis Association then adopted the plan, which has raised an aggregate of \$80,000,000.

Vapor-Gas

Inquiries have been received by the Bureau of Investigation concerning "Vapor-Gas for Piles," an alleged "scientific remedy" put out by the Vapor-Gas Company of Vining, Minn. According to a leaflet for Vapor-Gas, the product "has never come in contact with a case it did not subdue with immediate relief the first treatment." The same leaflet claims that "These vapors and gasses penetrate every pore of the rectum. It also disinfects every exposed part and removes your troubles immediately—It's not a salve nor a pill—just gas." From an analysis made in the A. M. A. Chemical Laboratory it was concluded that the product consists essentially of a coarse mixture of commercial sodium hydroxide (98.5 per cent) and commercial gelatin (approximately 1.2 per cent). Thus a mixture consisting essentially of caustic soda and gelatin is hailed as a "new and marvelous discovery" and the "vapors" from such a combination are said to constitute a "scientific" treatment of hemorrhoids. The Food and Drugs Act of 1906 has never been adequate to meet this kind of exploitation. (J.A.M.A., Oct. 31, 1936, p. 1488.)

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.
L. H. Rutledge, M. D.

W. F. Braesch, M. D., Chairman

J. C. Michael, M. D.
A. N. Collins, M. D.

What Can I Do For My County and State Medical Society?

Control of the rapidly expanding field of public health will remain in the hands of the physicians, **ONLY**, if the physicians give it their active coöperation and support.

What are you doing in your county society to coöperate with your local health officials and your local program for the public health?

Action By The Delegates

The House of Delegates of the Minnesota State Medical Association met in special session at the Saint Paul Hotel, Sunday, November 1: formulated certain important general principles regarded by the delegates and by the medical profession in general to be essential to the delivery of good medical care.

The immediate objective of the meeting: an official recommendation embodying these principles and designed for presentation to the Interim Committee of the legislature. This committee is now embarked upon the final stage of its task, which is to draw up a workable plan coördinating welfare work in Minnesota for submission at the 1937 session of the Legislature.

Rights of the Sick

The following recommendations, drawn up in the form of answers to a set of pertinent questions sent to delegates and officers prior to the meeting by the Committee on Public Policy and Legislation, were unanimously passed by the delegates.

Question 1. Do you believe that the recipient of relief should have the right to select the physician who is to render medical and surgical treatment to him or members of his family?

Answer. We recommend that where medical aid is to be rendered to a recipient of relief in any form,

the recipient or his guardian should have the right to choose his own physician.

Choice of Hospital

Question 2. In the event hospitalization is necessary do you believe this right should extend to the selection of the hospital?

Answer. We recommend that where local private hospital facilities are available, adequate and practicable, the recipient of relief or his guardian should be allowed his own choice of institution.

No Action

Question 3. The House of Delegates at the last state meeting at Rochester expressed its opinion that the county system of the care of the indigent is preferable to the town system. If the legislature should create a county welfare board in each county do you believe that a physician and surgeon who is duly licensed to practice medicine in the state of Minnesota, and who is a member of the local county or district medical society, should be a member of such county welfare board? (a) In what manner do you believe such physician should be selected? (b) Do you believe that a physician and surgeon who is a member of such a county welfare board should render professional services to the recipient of relief?

Answer. We suggest that this body should take no official action on this matter. The first part is controversial and it is not a question that the medical profession is going to be able to settle. It is a question whether the legislature will be able to settle it in this session. So far as a physician going on the board is concerned, we feel that this matter, also, is going to open up altogether too many openings for argument. Therefore, we suggest no action on those thirteen lines.

Paying the Doctor

Question 4. Do you believe that the allowance for professional services should be paid to the recipient of relief or direct to the physician? (a) If the patient is on so-called direct relief? (b) If the patient is on so-called work relief?

Answer. We recommend that the allowances for medical services for recipients of relief of any kind should be paid directly to the physician.

Question 5. What form of authorization, exclusive of emergency cases, do you believe to be the most satisfactory and practical, taking into consideration: (a) The needs of the patient; (b) the orderly administration of relief; (c) the assured payment of the bill.

Answer. We recommend that all forms of authorization for medical relief services shall continue as they are set up at the present time. In other words, the SERA authorization forms which were put into effect by the state some time ago at the request of Dr. Meyerding and this Association, should carry on.

Opposed to Bidding

Question 6. Are you opposed to the so-called practice of "bidding" in the rendering of professional services to the recipients of relief?

Answer. We are opposed to the so-called practice of bidding for rendering of medical services, and believe that we should revert to the principle we established in the first article, the right of choice of physician.

Question 7. Do you believe that the furnishing of adequate medical and surgical attention to a recipient of relief is of sufficient importance, not only from an economic standpoint but from the point of view of the patient, the taxpayer and the state of Minnesota, to warrant a separate consideration of each case?

Answer. Yes.

Question 8. Do you believe that occasionally there are individuals in the community who are in need of medical relief, who are not on relief insofar as the other necessities of life are concerned?

Answer. Yes.

In addition it was agreed that a definite recognition of the duty of a physician to care for the sick, whether funds are available to pay for the care or not, should be made in the preamble to the statement prepared by the Committee on Public Policy and Legislation. Also an official endorsement of the county medical advisory committee as the logical agency for settlement of difficulties, auditing of bills in the individual counties.

Presented to the Committee

A communication embodying the above action was prepared by the Committee on Public Policy and Legislation and submitted by Chairman L. L. Sogge early in November to the Interim Committee.

Unofficial reports as this issue went to press were that the action had been favorably received and that the recommendations were being incorporated in substance in the committee's legislative proposals.

The Council Meets

Dr. George Earl of St. Paul was elected chairman of the Council to succeed the late Dr. H. M. Workman who had held the office for many years and who presided over that body for the last time only a month before his death.

Dr. B. J. Branton of Willmar was elected councilor of the third district to fill out Dr. Workman's unexpired term.

The first act of Dr. Earl upon assuming the chair was to call for a moment of silent tribute to his predecessor in office, Dr. Workman.

* * *

Once again the question of the advisability of establishing a uniform fee schedule for welfare work and indigent care all over the state was brought before the Council and disapproved. Fees should be set on a local or district basis, not on a state-wide basis, in the opinion of the Council.

For Drivers

When the Drivers' License Division goes before the Legislature in 1937 to ask for better physical examinations for automobile drivers and more "teeth" in the law to enforce regulations, it will have the aid of the medical profession. The Council recommended to the Committee on Public Policy and Legislation that every assistance be given the division in working out proper legislation.

* * *

The principle behind the new program of physical examinations for all American Legion members was approved by the Council. A conference between the executive committee of the Committee on Public Health Education and Legion officials was suggested, however, with a view to placing before Legionnaires the scope and cost of an adequate examination.

Study of Costs

A study of medical costs in Minnesota, covering the cost to the student and the state of a medical education, the cost to the practicing physician of overhead, equipment, transportation, expert assistance, the relation of physicians to population groups and

related problems was suggested and discussed.

A committee composed of President-elect A. W. Adson of Rochester, President W. W. Will of Bertha and E. A. Meyerding of St. Paul, to investigate possible sources of financial aid for such a study and also to report upon tentative plans at the next meeting was appointed by the Council.

"Our Changing Times"

Important talks made before the delegates at the Sunday meeting are reported briefly here:

Views of a Legislator

Said Dr. J. L. McLeod, state senator from Itasca county, member of the Interim Committee and chairman of the Reference Committee appointed by the Speaker to report upon the questions before the House of Delegates:

It is granted by all intelligent people, I believe, that we are going through economic changes which must alter considerably our relation to the general public.

The Social Security program involves a much larger number of people and many more activities than those involved in the administration of direct relief or work relief. The last legislature realized the fact but spent so much time wrangling over these problems that only the state set-up for old age pensions had been completed at the end of the session.

To Simplify, Consolidate, Correlate

The Interim Committee was created by a concurrent resolution to study needs of the state with a view of qualifying for other federal grants and with a view, also, of "simplifying, consolidating and correlating the administration of said aids in such state and county agencies as may be determined to be most economical, efficient and advantageous to the state as a whole."

Our committee went into action in February. We have been meeting twice monthly ever since listening, for the most part, to interested people and agencies. Each of them put up its own case and we have acted as a sort of jury, weighing testimony and trying to pick the best plan from all the conflicting proposals made to us.

The difficulties ahead did not strike us until after we had had two meetings, made up our minds and forthwith announced that we were now ready to draft plans for a county welfare agency into law. The moment this news hit the press we were overwhelmed with criticism from every part of the state. At the third meeting we hastily reconsidered our action and we have simply listened since then, hoping eventually to arrive at some plan that will meet with more general favorable response from the state at large.

Situation In Itasca County

The situation which confronts us is illustrated by Itasca county, which is my home and for which I have complete figures and details. The figures I am about to quote represent the entire year 1936 and are based upon actual experience in the first nine months of 1936.

Type of Aid	Estimated yearly total	Source of Funds		
		County	State	Federal
Direct Relief (Relief of).....	\$ 69,443.03	\$ 20,669.32	\$ 40,971.71	\$ 7,802.00
Poor and Hospital Relief.....	2,917.56	2,917.56		
Old Age Assistance Grants.....	113,585.80	18,930.96	37,861.94	56,792.90
Mother's Allowance.....	10,048.52	10,048.52		
Poor Farm.....	13,050.00	13,050.00		
County Hospital Care.....	12,792.60	12,792.60		
Sanatorium Care.....	11,867.40	11,867.40		
Transportation.....	1,645.60	1,645.60		
Deaf, Dumb and Blind.....	327.04	327.04		
Insane.....	3,090.52	3,090.52		
Epileptics.....	748.00	748.00		
Burials.....	4,136.00	4,136.00		
Care of Children (P. and H.).....	4,271.08	4,271.08		
Welfare Board Expense.....	211.52	211.52		
Outside Care (P. and H.).....	246.20	246.20		
Poor and Hospital—All Other.....	4,102.32	4,102.32		
Feeble-minded (P. and H.).....	1,944.48	1,944.48		
WPA Wages.....	287,000.00			287,000.00
CCC Allotments.....	35,175.00			35,175.00
Rural Resettlements (Includes Direct Grants Only—Not Loans).....	3,680.00			3,680.00
Forestry Projects.....	69,494.28			69,494.28
Bureau of Public Roads.....	68,845.00			68,845.00
Veterans' Relief.....	14,680.00		14,680.00	
Veterans' Compensation.....	205,752.00			205,752.00
Veterans' Hospital Care.....	10,035.00			10,035.00
Federal Surplus Commodities.....	19,800.00			19,800.00
National Youth Administration.....	8,400.00			8,400.00
Blind Pensions.....	2,880.00		2,880.00	
Judge of Probate—Dependency, Delinquency, Relief, Feeble-minded.....	12,590.00	12,590.00		
Totals.....	\$992,758.95	\$223,589.12	\$96,393.65	\$772,776.18
SUMMARY OF SOURCES OF FUNDS:				
Itasca County.....		\$123,589.12		12.44%
State.....		96,393.65		9.72%
Federal.....		772,776.18		77.84%
		\$992,758.95		100.00%

Deeper and Deeper Water

As it now stands, in carrying out the investigations and other necessary functions for our public welfare, it is quite possible for no less than four different investigators from four different agencies to visit one relief family in Itasca county in the course of one day. You and I as taxpayers are quite likely to be financing these investigators to go anywhere from one to 50 miles to visit one family and do what might be done better by a single investigator.

We must prevent such overlapping and we must evolve a plan that will provide proper accounting for funds. Otherwise we are going to get into deeper and deeper water.

"Up To Us"

Where do physicians come into this picture? Physicians must certainly make up their minds, now, just what they want to see established in the system to be evolved and go after it.

Medical aid is now fairly well established as a necessity of life. It is up to us to see that county boards and county commissioners assume financial responsibility for providing it.

Doctors in Distress Counties

The problem for physicians is particularly acute in the so-called distress counties. In Aitkin county, for example, there is a population of 15,000 people of whom about 9,000 are receiving some type of government aid. What becomes of a medical practitioner in a county like that? It is in just such counties that county commissioners, faced with the probability of having to spend several thousands of dollars for medical aid, are quite likely to say: Let's hire our own physician and put him here; then we won't have to consider local physicians at all and we won't have any more trouble.

Politics Enters In

The question of politics always enters in, of course. County officials jump up and tear their hair as soon as anyone suggests that somebody besides themselves should have a voice in the administration of welfare work in their counties. They lose sight entirely of the fact that the counties themselves, in most instances, provide only a small percentage of the money spent. They are sure they know as much about the medical and other needs of people on relief in their counties as anybody else could—and yet, as I have pointed out to them myself, they call in an engineer when they want to know how roads should be built. It is our job to show them that medicine, too, is a technical job and doctors must be consulted in the care of the sick.

No Stones

In any case, I want to say to this group today: You will make a serious mistake if you sit back now and say: This is no worry of mine; it is up to you fellows on the Interim Committee. If you do, you

cannot reasonably throw stones at the committee next April or May after the legislation has all been drafted and run through the Legislature. Now is your opportunity to inform yourselves and make concrete suggestions as to what you want.

* * *

Said Dr. R. G. Leland, Chicago, director of the Bureau of Medical Economics, American Medical Association:

The question before medicine today involves not only the immediate needs of the people but the future of medicine in the United States.

Something has happened to the people of this country recently that we all regret. There are many people who, today, are willing to accept all they can get for nothing but who, a generation ago would not have thought for a moment of accepting charity.

It is now recognized that medical care, like food, clothing, and shelter is one of the necessities of life: The problem is how to sort those who really need free care from those who do not; how to provide it efficiently and properly for the indigent and the marginal indigent.

Our position will be greatly strengthened, I believe, if we confine ourselves in our official actions solely to the medical aspects of these problems.

Building a Machine

All schemes advanced for payment for medical services should be examined with the greatest care. I have examined scores of them myself and all of them, I find, carry with them some implication that control will emanate from the same source as the money. There is in all of them the possibility that they will result ultimately in the building up, as they have done in Europe, of a tremendous political machine. You know from the reports of your confreres in Minnesota the results of state-managed medicine in Europe.

We recognize, of course, the necessity for a properly conducted social service and economic investigation to establish the necessity for relief. But such services should not extend so far as to be transformed easily into a bureaucratic organization prying into the affairs of citizens and coming unwantingly between patient and physician.

We must keep in mind, in making any recommendations for administration of medical care certain fundamental principles.

Professional Ethics

It is of first importance to reiterate at the outset, it seems to me, our adherence to the Principles of Medical Ethics established in substance some twenty-five centuries ago and still the basis for professional conduct today. We should devise some way of interpreting these principles to the public, and of showing that they are followed primarily for the benefit and protection of the public.

Secondly, the medical profession should not permit itself to be charged with the responsibility for determining indigency. Physicians are educated, licensed and accumulate experience to practice medicine only. It should be the responsibility of the regularly elected or appointed officials of a political subdivision to determine by one rule or another who is and who is not indigent. There should be no domination or control of the medical profession, on the other hand, in its determination of what shall be the nature and amount of medical care.

Discipline by Confreres

Disputes over the amount and payment of bills or any grievances about the nature of services should be referred to a medical advisory committee appointed by the county medical society. There can be, of course, a very close liaison between counties and the state medical society. The latter should be the guiding body; but the conduct of physicians should be disciplined by their own confreres.

No compulsion should be exercised over patients to accept medical care from a particular physician. In other words, the potential freedom at least to choose his own physician should be guaranteed to the indigent as well as to those who can pay for medical care.

The medical profession is confronted with particular danger when it seeks to co-operate with state agencies by adopting a low fee schedule for indigent care. Fees thus reduced for any purpose are likely to freeze at that low point.

Real Issue

We should remember, always, that the real issue in the midst of all these social changes, is that of providing people with a living wage. Most of the economic questions that confront us today would be solved automatically if there was enough money in the majority of pay envelopes to permit people to pay their own way.

Co-Operative Trend

The organization of mutual benefit associations or co-operatives is one of the noticeable trends of the last few months, especially. These co-operatives flourish particularly among rural people and they might not be bad if their concern were only to provide a fund out of which to pay a physician. But they do not stop there. One of the fundamentals of the co-operative organization, as you know, is dividends to members and I just cannot conceive of dividends paid to members unless it is intended that medical service be purchased wholesale on the basis of a salaried physician and retailed to members on the basis of their monthly dues. I take it that physicians everywhere are opposed to the salaried practice of medicine.

Occupational Medicine

Another popular movement of these times is worthy of discussion. This is the university and college health service movement which has grown so rapidly in the last few years. Industrial medicine has also spread in the same period. Now the question arises: Does the occupation of an individual create the need for a medical specialty? Must we have department store medicine, for example, and iron foundry medicine and office clerk medicine? If so, then I submit to you that the private practice of medicine must disappear altogether because, after all, everybody is either employed at something or he is unemployed; each time a man changed his employment under such a system he would be obliged to change his physician. It is my belief that the practice of medicine should be on a geographic, not an occupational or functional basis.

Congress of Allied Professions

The social and economic trends of the times are drawing all professional men and women in the United States together to fight for a common cause; for protection of the public welfare and the freedom to practice their respective professions without the interference of bureaus and politicians.

A unique feature of the 84th Annual Meeting of the Minnesota State Medical Association to be held in the St. Paul Auditorium May 3, 4 and 5 is a Congress of Allied Professions.

This congress will bring together, at the invitation of the medical association, representatives of all of the professions that are allied in the delivery of medical care, nurses, dentists, druggists, hospital executives. Representatives of the bar association will be invited, too.

An all day conference is scheduled for Monday with a large evening meeting at the Auditorium theater as a climax.

Among the speakers are nationally known personages: Dr. Morris Fishbein, Father Alphonse J. Schwitalla of St. Louis, Dr. Maxwell J. Lick, Erie, Pennsylvania, president of the Pennsylvania State Medical Association.

Notes From Chicago

At the Annual Conference of Secretaries: Minnesota's Basic Science Law was held up as a model and the decision of Minnesota's Supreme Court upholding and enforcing it was repeatedly quoted by Mr. J. W. Holloway, of the Bureau of Legal Medicine, American Medical Association. It is of interest to note that the basic science laws in the ten states where they

are now in effect have met with unanimous approval and support.

* * *

Dr. J. H. J. Upham, president-elect of the American Medical Association, especially urged a great effort on the part of all secretaries to secure a larger percentage of fellows in their memberships. In some states not many more than half the members are fellows of the American Medical Association.

For the General Practitioner

Surgeon General Thomas Parran of the United States Public Health Service and Miss Katherine F. Lenroot, Chief of the Children's Bureau of the Department of Labor, talked to the secretaries.

Both reflected a significant change of policy and attitude on the part of their respective departments of the government.

Apparently it is recognized by both that progress in public health and welfare cannot be achieved without the active and sympathetic coöperation of the general practitioner of medicine.

Said Dr. Parran: "*The administration has no immediate intention, at least, of taking any action looking toward the socialization of medicine.*"

It is evident, however, that the general practitioner must, in the interest of the public health and in his own interest, too, work closely with the public health officer. His best defense against socialization is to assume, himself, the duties of guardian of the public health,—duties which he has sometimes failed to assume in the past.

The present administration is apparently sympathetic toward the problems of the general practitioner, appears to have discovered him, in fact (it would be interesting to know just how and when).

There is no reason, however, why the practitioner should relinquish his independence or become subservient to government control.

Dr. Parran particularly emphasized the importance of a fresh effort to control syphilis, tuberculosis and pneumonia. He suggested that individual state medical societies assist in this effort, called attention to special committees appointed in several states already for this purpose.

Veiled Threat

Miss Lenroot likewise asked for the coöperation of the general practitioner in the government program for maternal and child care to be financed by appropriations under the Social Security Act. This phase of the Social Security Act is reminiscent of the Sheppard-Towner Act—with this important difference: control of funds is now lodged with physicians and their coöperation is being sought.

There was, however, a veiled threat in Miss Lenroot's remarks. If organized medicine fails to take an active part in the program for maternal and child care, complete government control will follow.

The Healer of Cos

(An Editorial Prepared by the Medico-Legal
Advisory Committee)

The past twelve months have brought such changes in economic problems that sometimes one feels in a whirl of apprehension as to the future of the medical world.

Yet when one studies the past, one realizes that history but repeats itself. The situations that worry us today have their counterpart in the early world of Greece and Rome.

Hippocrates, when he studied the sociological trends of early medical practice, might have been thinking in the terms of our own day: his thoughts expressed in his writing are as true now as they were then.

Quoting two paragraphs from his Oath, we read:

"WITH PURITY and holiness I will pass my life and practice my art. I will not cut a person who is suffering with a stone, but will leave this to be done by practitioners of this work. Into whatever houses I enter I will go into them for the benefit of the sick and will abstain from every voluntary act of mischief and corruption; and further from the seduction of females or males, bond or free."

"WHATEVER, in connection with my professional practice, or not in connection with it, I may see or hear in the lives of men which ought not to be spoken abroad, I will not divulge, as reckoning that all such should be kept secret."

Do they not apply equally to our conduct today? We, too, maintain the sanctity of our calling, the operation only when necessary, the holding of proper consultation, the benefit of

the patient held uppermost at all times, the inviolability of the patient-physician confidential relations.

If each member of our Association will read the Hippocratic Oath before January 1 next and follow even partially the great truths contained in the writing of this sage, 1937 should be a happy and successful year for all. Many of the problems of your Medico-Legal Advisory Committee will be obliterated and we shall be united in a solid front against the inroads of outside interests seeking to break down medical customs which have lived through the centuries.

Michigan Filter System

An interesting experiment in the sorting of the actually needy from those who might pay their doctor and hospital bills is under way in Michigan.

It is called the "Michigan Filter System" and it was developed by the Michigan State Medical Society with the assistance of the Michigan Hospital Association, the Michigan Association of Probate Judges, the augmented State Administrative Board, the Crippled Children Commission and the Auditor General's office.

The special object is to filter needy "afflicted children" and "crippled children" who are entitled by law to free medical care in Michigan from those who are not needy.

Two Boards

The system calls for two boards. One is a medical board, appointed by the county medical society, which examines each candidate for medical care to see if there is a medical need, if this need is urgent and what will be the probable period of hospitalization and treatment. The other is an economic filter composed of laymen and appointed by the Judge of Probate with the advice and counsel of the medical society's representatives. This board investigates and approves or rejects on economic grounds.

This system is modeled after a similar organization that has functioned in one Michigan county for some years for afflicted adults.

Notice!

Physicians are NOT exempt from old age benefit assessments.

It has come to the notice of authorities that many physicians have confused the retirement for unemployment insurance under the Social Security Act with the requirements for old age benefits.

All employers in the included employments—no matter how many they employ—must return the proper forms by December 5, 1936.

See your postmaster for forms SS-3 and SS-4. The deadline is December 5. After that there is a penalty.

It is now in operation in eighty-two counties in Michigan for beneficiaries of afflicted and crippled children's legislation and appears to have the endorsement and approval of state officials as well as the medical society. Adequate remuneration for their work is secured to the physicians who, in turn, assume full responsibility for needed care. As a result, a reduction of from 40 to 60 per cent has been made in appropriations for care of afflicted and crippled children.

Criticism

Certain bitter criticism of the plan has been voiced particularly by those who profess to be interested in sanatorium care for the tuberculous in Michigan.

According to these critics the filter is sifting too fine. Investigation has shown that these criticisms are not justified since care for the tuberculous is largely governed by laws that are not within the province of the filter boards to administer and the critics were probably not informed as to the groups that are subject to the filter.

The fact remains, of course, that any such filter system is likely to be a special target for criticism if it is sponsored or carried on under medical society management.

West Coast Abortion Ring

An "abortion ring," so-called, was uncovered recently on the Pacific coast. The ring consisted of eleven persons, four of whom were licensed physicians and one a nurse. Among the laymen is a former enforcement officer of the California State Board of Medical Examiners. They operated in Washington, Oregon and California.

The physicians were convicted and sentenced to prison terms together with two of the laymen. The others, including the nurse, were allowed to apply for probation.

Minnesota is to be congratulated on the vigilance of its Board of Medical Examiners that has so effectively functioned to prevent such scandals in Minnesota.

Minnesota State Board of Medical Examiners

Negro Quack Pleads Guilty to Unlawful Practice of Healing

Re: State of Minnesota vs. Samuel P. Shokunbi, alias Samuel Kojoe Pearse, unlicensed

Samuel P. Shokunbi, alias Samuel Kojoe Pearse, a Negro forty-one years of age, entered a plea of guilty on October 8, 1936, to an information charging him with practicing healing without a Basic Science Certificate. Shokunbi entered his plea of guilty before the Honorable James C. Michael, Judge of the District Court at St. Paul.

Following an investigation made by the Minnesota State Board of Medical Examiners, a complaint was filed on July 22, 1936, charging the defendant with practicing healing without a Basic Science Certificate. Shokunbi had been operating from his home at 739 Rondo St., St. Paul. At the time of his arrest he stated that he was born at

Lagos, Nigeria, Africa. He stated that he came to the United States in 1922, and that he had studied osteopathy and naturopathy at the "Standard College" and the "National College in Chicago." He was specializing in the sale of Shokunbi's Herb Tonic, Shokunbi's Gall Stone Remover and Shokunbi's Female Regulator. The price varied from \$2.00 to \$5.00 per bottle. When Shokunbi was arraigned in court he demanded a preliminary hearing and one woman, who testified at the preliminary hearing, stated that "Dr." Shokunbi told her to "remove all her clothing" and then told her she had "kidney and female trouble." After being examined she was told that she could be cured for \$15.00 worth of Shokunbi's medicine. A book was found at the

defendant's place of business called the "Cottage Physician," describing hundreds of ailments and describing the medicine used in the treatment of these ailments. The testimony also showed that the defendant came to the homes of the various patients, and that he had obtained various sums of money from a considerable number of patients, all of whom were Negroes.

The defendant was arrested in May, 1927, at St. Louis, Missouri, on a suspicion of robbery, and in July, 1927, he was sentenced to four years at hard labor in the Federal Penitentiary at Leavenworth. This sentence was imposed in the United States District Court at St. Louis, for using the mails to defraud in connection with the sale of medicine. He served twenty-seven months of this sentence and was released. He was sentenced under the name of Samuel Kojoe Pearse. Shokunbi admitted that he has no license to practice any form of healing anywhere in the United States.

Following the submission of all the facts to the Court, Judge Michael sentenced Shokunbi to a term of sixty days in the St. Paul Work House and placed him on probation for one year under the supervision of the probation officer. Shokunbi was admonished by Judge Michael to "Get out of the patent medicine business and quit trying to be a doctor." Subsequent investigation by the Medical Board discloses that Shokunbi has removed the signs from his premises and that he is engaged in driving a truck at the present time.

John F. Class Health Unit Ordered Closed in Minneapolis

Following an investigation by the State Board of Medical Examiners the John F. Class Vapo-Path unit at 2500 Colfax Avenue South, Minneapolis, was closed on November 4, 1936. The place was being operated by a (Mrs.) Hazel H. Aldridge and a Mr. E. R. Steadman. Mrs. Aldridge claims to be a registered nurse. The place was being operated under the "rules and regulations" of the John F. Class Co., Inc., Dayton, Ohio. Mrs. Aldridge stated that she and Carl A. Fjelstad, M.D., Minneapolis, entered into a contract with the Class company to purchase the unit for a sum in excess of \$3,000.00. She also stated that about \$1,000.00 was paid in cash and the balance to be paid \$50.00 per month. Dr. Fjelstad put in no cash but was to receive \$3.00 for the "examination" of each patient. Treatments cost \$3.00 for one, \$25.00 for ten and \$45.00 for twenty. Patients were placed in a cabinet and heated mineral fumes generated in the basement of the building entered the cabinet after which the patient was given a massage. The patient was also given a drink of mineral water before and after the treatment.

In 1931 the John F. Class Health System attempted to operate in St. Cloud by "leasing" their unit to persons not licensed to practice in Minnesota and this was also stopped by the Medical Board. At that time testimonials were put out over the name of the John F. Class Health System that it was good for colds, arthritis, asthma, kidney trouble, diabetes, tuberculosis and cancer.

Mrs. Aldridge and Mr. Steadman were advised by Mr. Peter S. Neilson, assistant county attorney assigned by Mr. Goff to assist the Medical Board in cleaning up quackery in Hennepin County, that a complaint would be issued unless the place was closed at once. Mr. Brist made the investigation for the Medical Board and represented them at the conference in Mr. Goff's office.



REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for December

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 1:45 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

- December 2—Marking Babies
- December 9—The Use of Cosmetics
- December 16—Weight Control
- December 23—The Winning Fight
- December 30—Your Teeth—A New Year Resolution.

American Association for the Study of Goiter

The American Association for the Study of Goiter again offers the Van Meter Prize Award of \$300 and two honorable mentions for the best essays submitted concerning experimental and clinical investigations relative to the thyroid gland. The award will be made at the next annual meeting scheduled for Detroit in June.

Manuscripts, not to exceed 3,000 words, should be sent to Dr. W. Blair Mosser, 133 Biddle Street, Kane, Pennsylvania, not later than April 1, 1937.

Minnesota Public Health Association

Dr. Charles H. Mayo of Rochester, retiring active president of the Minnesota Public Health Association, was named honorary life president of the organization at its annual dinner held at the Nicollet Hotel, Minneapolis, November 13.

Dr. Mayo served as toastmaster at the dinner, at which the principal speakers were: Dr. Horton Casparis, Nashville, Tennessee, professor of pediatrics at Vanderbilt University Medical School and President of the Tennessee Tuberculosis Association; Dr. Caroline Hedger, staff member of the Elizabeth McCormick Memorial Fund, Chicago, Illinois; and Miss Frances Brophy, New York City, field adviser of the National Tuberculosis Association.

A feature of the program was the presentation by Dr. Mayo of a distinguished service pin to Miss Theresa Ericksen, veteran war nurse and pioneer public health nurse, for her pioneer work for the Christmas Seal.

Representatives of forty coöperating agencies, county public health association officers, local Christmas Seal managers, physicians and nurses attended the dinner, which marked the thirtieth anniversary of the introduc-

tion of the Christmas Seal into America as an agent to combat tuberculosis.

Preceding the dinner, an all-day session was held in St. Paul opening with a Christmas Seal Institute in the morning, followed by a luncheon with business sessions in the afternoon. Officers elected are: Dr. O. J. Hagen, Moorhead, president; Dr. Lewis S. Jordan, Granite Falls, first vice president; Mrs. A. L. Sperry, Owatonna, second vice president; Mrs. G. R. Day, Farmington, secretary; A. M. Calvin, Saint Paul, treasurer, and Dr. E. A. Meyerding, Saint Paul, executive secretary.

John W. Bell Tuberculosis Lecture

Dr. H. E. Kleinschmidt, Medical Director of the National Tuberculosis Association and recognized as one of the outstanding authorities on the fight against this disease, will deliver the third annual John W. Bell Tuberculosis Lecture before members of the Hennepin County Medical Society, Monday, December 7, at 7:45 p. m.

Dr. Kleinschmidt will be the third speaker of national reputation brought before the society by this lectureship. The lectureship was founded as a memorial to the late Dr. John W. Bell and each year serves as a tribute to him and to one other outstanding physician.

This year the lecture will also honor Dr. Frederick A. Erb, who died October 25 while President of the Hennepin County Tuberculosis Association. Dr. Erb, who was born and educated in Minneapolis, had practiced medicine in this city for thirty-four years. His active service in the Hennepin County Medical Society and the Hennepin County Tuberculosis Association, as well as his many public spirited activities in behalf of his community, made him one of the most respected and beloved members of his profession in the city.

The first Bell lecture, given in 1934, was delivered by Dr. Gerald E. Well of Colorado Springs on the subject "Pulmonary Tuberculosis Problems for the Practitioner." The second lecture a year ago was given by Dr. F. M. Pottenger of Monrovia, California, on "The Responsibility of the General Practitioner in the Prevention and Cure of Tuberculosis." Dr. Kleinschmidt's subject this year will be "The Doctor and Tuberculosis of the Future."

Dr. Kleinschmidt, a graduate of Washington University, has had a wide experience both in the active practice of medicine and in the public health service. Dr. Kleinschmidt started his medical career in St. Louis. Since 1927 he has been Medical Director of the National Tuberculosis Association. In that capacity of Medical Advisor to the 2,000 Tuberculosis Associations in the United States, he has been closely associated with all progress in tuberculosis work. He is therefore exceptionally well qualified to bring to the Hennepin County Medical Society the latest developments in tuberculosis control here and abroad.

Blue Earth Valley Society

The annual meeting of the Blue Earth Valley Medical Society was held at Blue Earth, November 12. The following officers were elected: President, Dr. J. Folta, Ceylon; vice-president, Dr. E. A. Thayer, Truman; secretary, Dr. W. C. Chambers, Blue Earth; Delegate, Dr. R. C. Hunt, Fairmont; censors, Dr. S. W. Sybilrud, Bricelyn, and Dr. W. H. Rowe, Fairmont.

Case reports were given by Dr. H. Boysen and Dr. H. L. Bailey and a general discussion followed.

East Central Minnesota Society

The East Central Minnesota Medical Society met at the Colony for Epileptics at Cambridge, Minnesota, on November 20, 1936. The following officers were elected for the coming year: Dr. A. K. Stratte of Pine City, president; Dr. A. A. Peterson, Mora, vice president; Dr. H. C. Cooney, Princeton, delegate; Dr. A. K. Stratte, alternate; Dr. C. M. Ness, Cambridge, secretary and treasurer. Dinner was served at the institution. A scientific program was presented in the evening by guest speakers. Dr. E. A. Regnier discussed "Fractures" and Dr. C. J. Ehrenberg gave an address on "The Third Stage of Labor."

Mower County Society

The annual meeting of the Mower County Medical Society was held at the Austin Hotel, Austin, November 19, 1936, with Dr. J. K. McKenna as presiding officer.

The society endorsed the Austin Milk Fund project and appointed Dr. U. S. Anderson as a committee of one to represent the society in its relations with the Milk Fund board.

Officers elected were: President, Paul C. Leck, Austin; vice-president, R. S. Hegge, Austin; secretary, P. A. Robertson, Austin; treasurer, A. E. Henslin, LeRoy.

Red River Valley Society

The fall meeting of the Red River Valley Medical Society was held Tuesday evening, October 6, at 6:30 p. m. in the Evelyn Hotel at Thief River Falls, Minnesota. A dinner for the members and the Women's Auxiliary preceded the program. The scientific program was as follows:

Injection Treatment of Hernia—Dr. A. M. Smith, Thief River Falls, Minn.

Discussion of Case Reports of Streptococci.

Meningitis of Otitic Origin—Dr. C. L. Oppegaard, Crookston, Minnesota.

Individual case reports were presented by Drs. O. F. Melby, L. G. Culver, and C. W. Froats, all of Thief River Falls.

Renville County Society

The annual meeting of the Renville County Medical Society was held at Sacred Heart, on November 12.

Dr. L. Strassmann of Berlin, Germany, gave a very interesting talk on "State Medicine as Practiced in Germany."

Dr. W. F. Braasch of Rochester spoke on "Modern Treatment of Infections in the Urinary Tract."

Mr. F. Manley Brist of St. Paul discussed legal and legislative problems of interest to the medical profession.

The following officers were elected for the coming year: President, Dr. R. C. Adams, Bird Island, vice president, Dr. J. Dordal, Sacred Heart; secretary-treasurer, Dr. R. S. Madland, Fairfax; censor, Dr. E. H. Loenholdt, Hector; delegate, Dr. W. A. Brand, Redwood Falls, alternate, Dr. A. A. Passer, Olivia.

Rice County Society

The second annual dinner of the Rice County Medical Society and Auxiliary was an event of Thursday evening, November 12, at the Faribault Hotel.

The special guests were Dr. and Mrs. R. L. Wilder of Minneapolis and Dr. C. E. Ward of Rochester, Minn. Dr. O. P. Thorson, of Northfield, presided as toastmaster.

The two main talks of the evening were given by Dr. Wilder, who spoke on "Prevention of Contagious Diseases in Children" and Dr. Ward, of the Mayo Clinic, on "Preserving Child Health with Special Emphasis on Hygiene, Nutrition, and Habits."

Short talks were made by Mrs. M. L. Mayland and Mrs. A. M. Hanson in behalf of the Auxiliary.

Southwestern Minnesota Society

The annual meeting of the Southwestern Minnesota Medical Society was held at Worthington, November 18. The following officers were elected: President, E. A. Kilbride, Worthington; vice-president, C. L. Sherman, Luverne; secretary-treasurer, H. DeBoer, Edgerton; delegates, E. A. Kilbride, Worthington, and S. A. Slater, Worthington.

Speakers were Horace Newhart, Minneapolis, and Dr. B. J. Branton of Willmar, who discussed legal questions involved in the practice of medicine.

Washington County Society

The Washington County Medical Society was addressed on October 13 by Dr. Howard K. Gray of the Mayo Clinic. His subject was "Surgery of the Gallbladder and its Terminal Effects" and the address was illustrated.

The Society was given an illustrated address on November 10 by Dr. W. A. Fansler of Minneapolis on the subject of "Rectal Pathology," special reference being given to surgical and non-surgical treatment of hemorrhoids. The scientific program was followed by a discussion of economics.

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of October 7, 1936

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, October 7, 1936. The meeting was called to order at 8 o'clock by the president, Dr. Thomas S. Roberts.

There were fifty-two members and one guest present.

Minutes of the May meeting were read and approved.

The scientific program consisted of two papers.

CHORDOMA

ARNOLD SCHWYZER, M.D.

Saint Paul

Dr. Schwyzer read a paper on the above subject, reported a case, and showed lantern slides. (To appear in *MINNESOTA MEDICINE*, January, 1937.)

Discussion

DR. J. F. CORBETT (Minneapolis): I greatly enjoyed listening to this very complete discussion. I personally have had but one case of chordoma and that was just the opposite of Dr. Schwyzer's case. At the time I saw this patient, there was a large tumor involving the second and third and several other cranial nerves. It was on the front of the sphenoid. The remarkable thing about it was that it could not be removed because of its size. A decompression gave relief for a long period of time. The tumor was slow in growth undoubtedly, although it was cellular, which would indicate there was some malignancy.

DR. ROBERT EARL (St. Paul), in discussion of Dr. Schwyzer's paper, reported the following cases of chordoma.

The patient, Miss L., aged forty-six, unmarried, first consulted me on April 6, 1936. Her family and personal history were negative.

All of her laboratory findings were negative except for a moderate secondary anemia. She had never been sick until August 15, 1935, when she developed a severe bearing down pain in the rectum which was more or less constant for two weeks. She consulted a physician, who told her she had a hemorrhage in the rectum. The patient had never seen any blood in the stool. Hot sitz baths relieved her discomfort temporarily. The pains and discomfort improved some, so she taught school until April 3, 1936. On February 2, 1936, she was examined by another physician, who diagnosed tumor of the uterus and advised operation. When I saw her on April 3, 1936, her appetite and digestion were normal. With the aid of mineral oil, she had one slender formed stool a day. No blood or mucus were seen in the stools. Her periods had been irregular the past few months. Her general physical examination was negative.

Pelvic examination disclosed a tumor in front of the sacrum and left side of the pelvis extending down to the sphincter ani. The vagina and rectum were

pushed to the right anterior part of the pelvis. The cervix could not be reached. Some irregular masses could be palpated on the lower abdomen just above the pubis.

On April 9, 1936, I explored through a midline suprapubic incision. I found the uterus, tubes and ovaries essentially normal but pushed up into the abdomen and resting on top of a tense mass which filled the entire pelvis. On opening into this mass, I found a broken-down degenerated mass containing some brown cystic fluid and masses of broken-down tissue filling the entire pelvis. I removed as much as possible of the degenerated mass and swabbed the cavity with formalin solution. I packed the cavity with gauze, one end of which was brought through an opening made in the vault of the vagina through which it was removed two days later.

The tubes and ovaries were removed. The uterus was not removed but was retroverted and sutured over the peritoneal line of incision to reinforce it and protect the peritoneal cavity.

Although the patient was given four postoperative courses of deep x-ray therapy, the growth is recurring.

The microscopic section shows one of the typical forms of chordoma of the more malignant type. On the lantern slide, one can see the similarity to parts of the section from Dr. Schwyzer's case.

DR. R. G. ALLISON (Minneapolis): Several months ago we had a young man sent in to us for x-ray examination who had sustained a rather trivial injury to his back. The injury was more on the order of a strain. We found a clean-cut line of cleavage, showing only in the lateral plate, bisecting the body of one of the lumbar vertebrae. Subsequent plates have shown no change in this line of cleavage. The consultants who have seen this have diagnosed it as a remnant of the notochord. This is the first such case I have seen and I have seen none mentioned in the literature. I wonder if Dr. Schwyzer could tell us if he has seen any such findings shown by x-ray examination.

DR. ARNOLD SCHWYZER (in closing): I am sorry I cannot answer Dr. Allison's questions because I have not any sufficient experience in these cases as to the x-ray findings.

The two cases reported by Dr. Corbett and Dr. Earl just show how these cases vary in malignancy. The case reported by Dr. Corbett is that of a slow insidious growth. In that case, decompression would do good for a while; whereas, in the very malignant case Dr. Earl reported, I do not think there is much to be done unless one could get such a case at a very early date.

As for the diagnosis—I made that diagnosis myself when I began to think about the case; and, on examining the sections carefully, it was plain that we had a chordoma. The location of these tumors is of great importance for the diagnosis. Ewing said the location

was more important than the microscopic appearance. The microscopic picture may vary very much. Thus, the combination of the topography together with the microscopic findings is important for the diagnosis.

SEVERE CUTANEOUS REACTIONS TO THE BARBITURATES

S. E. SWEITZER, M.D., and CARL W. LAYMON, M.D.
Minneapolis

Summary

1. Attention is called to the possible dangers attendant with the administration of the barbiturates.

2. Four cases (three of which were fatal) of severe cutaneous reactions to these drugs were reported.

3. The theoretical consideration of drug eruptions with reference to the mechanism of sensitivity, the localization of the shock tissue and the types of eruptions were briefly presented.

4. The resemblance of drug allergy to serum disease and of certain eczematous drug eruptions to dermatitis of external origin makes it probable that the differences between these three types of allergy (drug allergy, serum disease and contact dermatitis) are not great.

5. It is believed that the site and type of hypersensitive tissue which an excitant (drug, serum or external agent) reaches is the chief factor in the type of response to that excitant, rather than the mechanism of sensitization or the route by which the excitant reaches the tissue.

Discussion

DR. E. L. GARDNER (Minneapolis): I am particularly interested in this paper because, in functional gastrointestinal disturbances, phenobarbital in $\frac{1}{4}$ grain (or less) doses is used over long periods of time. Personally, I have never seen any reaction when prescribed in these small doses. Skin reactions, usually occurring early, may occur after taking 1.5 to 5 grains in twenty-four hours, but these chronic cases taking the small doses, even for many months, do not show skin reactions or depression of the leukocyte count. Possibly the repeated small doses desensitize the patients to the drug. I wonder if Dr. Sweitzer has ever seen any reactions when the dose has been not over $\frac{3}{4}$ grain in any twenty-four hours? The cases Dr. Sweitzer reported were very ill from other diseases and this general debility may have been the most important factor.

I think this is a very important contribution. Many of the supposedly "harmless" drugs may sometimes produce serious results—mineral oil sprays in the nose may produce a very serious type of chronic pneumonia and the long-continued use of magnesium may produce serious calcium depletion.

DR. FRANKLIN WRIGHT (Minneapolis): About thirty-five years ago, when I studied dermatology, about 400 different drugs had been reported as producing eruptions on the skin. In the last few years our American pharmacists have outdone themselves in supply-

ing good drugs. I have had no experience with barbital skin eruptions, but had an experience with barbital which I would like to report. I did a prostatectomy, and, in four days, the patient was sitting up in bed. His physician came in on the fifth day and ordered albargene (a barbital compound) 5-grain tablets, one tablet at 4 p. m., one at 7 p. m. and one at 11 p. m. At three o'clock the next morning the hospital called me. I found the patient with a pulse of 150 and I thought he would not live until daylight. I ordered hypodermoclysis and filled him with strychnine and he gradually got better. Now, at the end of six weeks, he is still in a wheel chair, making a very slow recovery.

I believe that his collapse was due to barbital contained in the albargene.

DR. R. T. LAVAKE (Minneapolis): I agree with Dr. Gardner that this is a very important subject. I suppose few use the barbiturates more than the obstetrician. We have used pentobarbital in practically every labor since it came upon the market. In this period we have seen only three or four cases of mild dermatitis due to its use. It seems to me that the crux of the matter lies in warning against the continuance of the drug at the first untoward sign. To my mind, we should not deprive patients of the benefits of the barbiturates through the exaggeration of their danger.

I agree thoroughly with Dr. Roberts, that the indiscriminate sale of these drugs without prescription should not be allowed.

If I am not mistaken, three of the four fatal cases reported in this paper were found to have a bronchopneumonia at autopsy. It would suggest itself to me that these cases might be interpreted as very sick people who happened to receive barbiturates. I would like to ask if it was supposed that the bronchopneumonia was a result of the barbiturates?

DR. C. B. WRIGHT (Minneapolis): I would like to ask Dr. Sweitzer whether any of these patients showed any other evidence of allergy, or whether in the literature there is any indication that these people are allergic to other drugs. In allergies, the dosage is not so important as the degree of allergic tendency of the individual.

DR. PAUL O'LEARY (Rochester): There are two points I should like to discuss in regard to eruptions from the barbituric acid derivatives. The first is the so-called delayed reaction, in which the eruption may not appear until three to five days after the drug has been stopped. The cutaneous picture of this type of eruption is similar to that described by Dr. Sweitzer. I was surprised to hear the comments of the previous discussors on the rarity of eruptions from the barbiturates, because, in dermatological practice, during the past five or six years, these manifestations of intolerance to the drug have been quite common. Perhaps the recent efforts of the manufacturers to produce remedies that are apparently less toxic than the original preparations account for the scarcity of these reactions now in general practice and surgical work.

The second point which I wish to bring out is

illustrated by the recent work of Wise and Wile and their co-workers, who endeavored to study the role of allergy in the production of these lesions. Both of these investigators excised a plaque of dermatitis which had developed following the ingestion of a barbiturate and made a full thickness graft of this plaque on an area where the eruption had previously not appeared. The excised normal skin was grafted over the area where the dermatitis developed and from which the plaque had been excised. On administering a barbiturate within a week after the graft, the eruption reappeared in the patch of dermatitis that was transplanted. However, if several months were allowed to elapse, the grafted area soon lost its sensitivity; likewise, the normal skin which had been transplanted to the area of dermatitis did not develop the dermatitis, although the dermatitis tended to develop in other areas. It would appear, therefore, that the sensitivity is not a localized affair in the sense of a localized area, but is rather of a systemic nature.

DR. C. B. DRAKE (St. Paul): I have run across skin reactions following the use of luminal in just two instances. One was in an elderly patient at the City Hospital who, following the taking of about 1.5 grain of luminal for several nights, developed a severe dermatitis with extensive petechial hemorrhages. He recovered and later, through an error, was given luminal again and went through the same process. The other instance was in a private patient who developed a macular eruption from one small dose of luminal.

In this connection, I wish to report what was apparently an unusual experience I had last winter, from the use of quinidine. An elderly woman was given 2 grains of quinidine after dinner one night because of extrasystoles. In the early morning hours she awoke with severe burning in her skin, and, when I saw her, she had a generalized erythema, and later even petechial hemorrhages in both legs. General desquamation followed involving the palms and soles. Inasmuch as she had had a small dose of luminal, the two preceding nights, I was unconvinced that the quinidine was the cause of the dermatitis. Two weeks later 1 grain quinidine produced the same symptoms, although in milder form. I assured myself that the druggist had made no mistake in the prescription and had a laboratory confirm the identity of the drug. This patient had taken quinine as a young woman without any untoward effect. She had, however, suffered from a severe dermatitis some years ago, following the use of hair tonic which, I imagine, may have contained some quinine. An interesting aftermath of her recent experience was the appearance of irregular ridges across the nails of fingers and toes, which was, doubtless, the result of the effect of the cutaneous reaction on the matrix of the nails. This, evidently, is a very unusual instance of sensitiveness to quinidine as the drug is used so extensively and the skin specialists I have questioned have none of them had a similar experience.

DR. R. D. MUSSEY (Rochester): I just want to add a word to Dr. LaVake's discussion. We have been

using these drugs for analgesia in confinement cases since 1929 and I think Dr. O'Leary will bear me out that his group has not been called at any time on account of an eruption due to the barbiturates.

I think Dr. Sweitzer's paper is very timely and that one should use the barbiturates with care, but I do not think we ought to throw this medication aside because of an occasional case of this sort. I am sure the average patient in labor can take this medication without any appreciable number of them developing drug eruption.

DR. H. E. MICHELSON (Minneapolis): I am heartily in accord with the gentlemen who have suggested that the sale of barbiturics should be definitely controlled by law. The change of psyche due to the long-continued use of these drugs is much more serious than the rare cutaneous involvement that Dr. Sweitzer has reported. When an eruption does occur, the external treatment is essentially that of any dermatitis and internally the use of alkalis.

DR. THOMAS S. ROBERTS (Minneapolis): In its broader application, this is a subject of much more than passing interest. While the cutaneous reactions following the administration of the barbiturates to persons with allergic sensibilities, especially those in impaired health, may be serious or even fatal, as described by Dr. Sweitzer, the subject of the general use of these drugs is of much wider and more vital importance. Thousands and thousands of people, with or without the advice of physicians, are taking regularly one or another of the various barbiturate preparations, frequently with deleterious effects and not uncommonly with disastrous results. In this, and in most states, these drugs are sold over the drugstore counter without restriction and conscientious druggists are worried and appalled at the extent to which the evil has grown. Barbiturates are all habit-forming and their consumption has become almost a national evil.

The regular taking of even small doses of the barbiturates and their special administration in large doses produces, in addition to the sedative effect, a suspension of the coördination of both the mind and body. The extent of these effects varies, of course, with the susceptibility of the individual, but it not infrequently results in chronic cases in the disorganization of the mental faculties and a muscular incoördination suggestive of locomotor ataxia. In the more common cases the mind is confused, the speech thickened, and muscular movements in general, are disordered and clumsy—much like an intoxicated person. The normal personality is lost. The mental condition may even simulate insanity with homicidal or suicidal intent. One individual that came under my notice was committed to an asylum after attempting to shoot his wife, but made a speedy recovery after the withdrawal of the drug—much to the surprise of the attendants, who were not aware of the cause. Another patient, after taking 10 grains of veronal three times daily for a short period, escaped and ran amuck armed with a brick with which he threatened all who interfered.

He returned to normal after suspension of the drug. A business man of large interests lost the ability to dictate a letter, to look after his affairs, became almost helpless physically, had retention of urine so that the use of a catheter became necessary, but recovered slowly, after the daily doses of veronal were discontinued. Cases of this kind could be multiplied many times from my own experience, but it would take too much time to recount them here. Suffice it to say, that they have led me to feel and to believe that the profession is handling (in the case of barbiturates) drugs that are so potent and so habit-forming that they should be used with very especial care and caution. As soon as possible, a law should be passed prohibiting the indiscriminate dispensing of these drugs in this state, as has already been done elsewhere.

DR. C. B. WRIGHT: It may interest Dr. Roberts to know that several states have already passed laws restricting the sale of barbiturates and that such a law is contemplated in Minnesota, if the druggists and pharmacists will coöperate.

DR. SWEITZER (in closing): In answer to Dr. Gardner's question, we have not seen reactions when the dose of barbiturate has not been over $\frac{3}{4}$ grain in any twenty-four hours. In most of our cases, however, the exact dose was not determined, since the drug was administered by physicians other than ourselves. Our patients, however, were not seriously ill from other diseases except the one who developed granulocytopenia.

In reply to Dr. LaVake, we felt that the bronchopneumonia, which was found at autopsy, represented a terminal complication, since no signs of pneumonia were found on the first examination.

As to the question of Dr. C. B. Wright, patients with drug allergy usually give no history of other personal or familial allergy.

Our purpose in presenting this paper was to call attention to the potential dangers of the barbiturates, rather than to decry their proper use by physicians who are alert to these dangers.

The meeting adjourned.

R. T. LAVAKE, M. D.
Secretary

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WOMAN'S AUXILIARY

Mrs. E. M. HAMMES, *President*,
1456 Summit Avenue, Saint Paul
Mrs. A. A. PASSER, *Editor, Press and Publicity*, Olivia

THE first meeting of the new board of the Woman's Auxiliary to the Minnesota State Medical Association was held on Wednesday, October 14, 1936, at the home of Mrs. E. M. Hammes, state president, at Saint Paul, thirty members being present. The budget was discussed and approved, and reports of committee chairmen were approved.

Dr. W. W. Will, president of the Minnesota State Medical Association, and Dr. E. A. Meyerding, executive secretary, reviewed the social and economic problems of the day as they affect the practice of medicine.

The Auxiliary will again coöperate with the Minnesota Public Health Association in sponsoring the annual high school radio contest held in connection with the 1936 Christmas Seal educational campaign.

The members of the Woman's Auxiliary extend to Mrs. F. A. Erb, state recording secretary, deepest sympathy in the loss of her husband who passed away at the family home in Minneapolis, October 18.

St. Louis County Auxiliary

Mrs. E. M. Hammes, president of the state Woman's Auxiliary, was a guest speaker at the membership tea which the members of the St. Louis County Auxiliary gave in September, at the home of Mrs. Le Roy E. Doolittle in Duluth. Mrs. Thomas O. Young and Mrs. L. R. Gowan were co-chairmen for the event assisted by Mrs. C. O. Kohlbry, Mrs. William Strobel, Mrs. L. L. Merriman and Mrs. W. E. Hatch. Mrs. W. C. Martin was in charge of the entertainment.

Members of the St. Louis County Auxiliary were entertained at the Fay Hotel in Virginia at a one o'clock luncheon by the Virginia group. A social hour followed the meeting, which opens activities of the groups for the year. Mrs. Robert S. Forbes is president of the Auxiliary; Mrs. W. N. Graves, first vice president; Mrs. Harry Klein, second vice president; Mrs. Elmer J. West, recording secretary; Mrs. C. W. Taylor, corresponding secretary; Mrs. P. S. Rudie, treasurer, and Mrs. A. E. Walker, historian.

Wright County Auxiliary

Mrs. E. M. Hammes and daughter, Miss Maud Hammes, were guests of the Wright County Auxiliary at a meeting held at the home of Mrs. J. J. Catlin, in Buffalo, on Tuesday, October 20. A joint banquet, with the members of the Wright County Medical Society, followed the afternoon session.

Renville County Auxiliary

The members of the Renville County Auxiliary were entertained at the home of Mrs. J. J. Dordal of Sacred Heart, on Thursday, November 12.

BOOK REVIEWS

The president, Mrs. R. C. Adams of Bird Island, presided at the business session, which was followed by a joint banquet with the members of Renville County and Camp Release Medical Societies.

Hennepin County Auxiliary

Mrs. Stephen H. Baxter and Mrs. Chester Stewart presided at the tea table at the tea given Friday afternoon, November 6, in the Medical Arts Library, following a talk by Mrs. Arthur A. Law, whose husband, the late Dr. Law, was a leading member of the Hennepin County Medical Society. Her subject was "People and Places in South America," and she illustrated it with slides. Guests were wives of visiting doctors in Minneapolis for homecoming at the University of Minnesota.

BOOK REVIEWS

NUTRITIVE AND THERAPEUTIC VALUES OF THE BANANA. A Digest of Scientific Literature. 143 pages. Paper cover. Boston: United Fruit Co., 1936.

APPLIED DIETETICS. Sanford Blum, A.B., M.S., M.D. Head of Department of Pediatrics and Director of Research Laboratory, San Francisco Polyclinic and Post Graduate School. 408 pages. Price, \$4.75, cloth. Philadelphia: F. A. Davis Co., 1936.

ALLERGIC DISEASES, THEIR DIAGNOSIS AND TREATMENT. Ray M. Balyeat, M.A., M.D., F.A.C.P. Associate Professor of Medicine and Lecturer on Diseases Due to Allergy, University of Oklahoma Medical School, etc. 516 pages. Illus. Price, \$6.00, cloth. Philadelphia: F. A. Davis Co., 1936.

KEEPING YOUR CHILD NORMAL. Bernard Sachs, M.D. Former President New York Academy of Medi-

cine, etc. 148 pages. Price, \$1.50, cloth. New York: Paul B. Hoeber, 1936.

THE PRACTICE OF MEDICINE. Jonathan Campbell Meakins, M.D., LL.D. Professor of Medicine and Director of Department of Medicine, McGill University, etc. 1343 pages. Illus. Cloth binding. St. Louis: C. V. Mosby Co., 1936.

MODERN TREATMENT AND FORMULARY. Edward A. Mullen, P.D., M.D., F.A.C.S. Assistant Professor Pharmacology and Physiology, Philadelphia College of Pharmacy and Science, etc. 707 pages. Price, \$5.00, flexible cover. Philadelphia: F. A. Davis Co., 1936.

1936 YEAR BOOK OF GENERAL MEDICINE. Edited by George F. Dick, M.D., Lawrason Brown, M.D., George R. Minot, M.D., S.D., F.R.C.P., William B. Castle, M.D., A.M., M.D., William D. Stroud, M.D., and George B. Eusterman, M.D. 848 pages. Illus. Price, \$3.00, cloth. Chicago: Year Book Publishers, 1936.

FUNDAMENTALS OF HUMAN PHYSIOLOGY.

J. J. R. Macleod, M.B., D.Sc., F.R.S., Late Regius Prof. of Physiology in University of Aberdeen, Scotland, and R. J. Seymour. 424 pp. Illus. Price, \$2.50. St. Louis: C. V. Mosby Co., 1936.

An excellent summary of the non-controversial present-day knowledge of physiology, written in such a manner as to be useful to the average physician for purposes of hurried review, and to be understandable for the intelligent student or layman who is willing to use the dictionary occasionally and is not frightened by technical names. If nurses and the lay public could be taught the contents of this book, the death knell of quackery and fallacious home treatment would be sounded.

R. E. CUTTS, M.D.

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